



**Headquarters, U.S.
Marine Corps**

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**AVIATION TRAINING AND READINESS
MANUAL, VOLUME 8
TACTICAL TILT-ROTOR
(SHORT TITLE: T&R MANUAL,
VOLUME 8)**

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Encl: (1) Locator Sheet

1. Purpose. To publish training standards, procedures and policies regarding the training of tactical tilt-rotor aircrews.
2. Background. Both chapters of this order incorporate the tenets of the Marine Aviation Campaign Plan.
 - a. The pilot chapter contains a unit template describing all like squadrons' core competencies, core and core plus skills, designations and numbers.
 - b. Simulator events are Combat Readiness Percentage (CRP) weighted.
 - c. All core skills are contained in the Combat Ready and Combat Qualification Phases of training. Core plus skills are in the Full-Combat Qualification Phase of training.
3. Recommendations. Recommended changes to the Aviation Training and Readiness Manual, Volume 8 are invited, and will be submitted via the Syllabus Sponsor and the appropriate chain of command to: Commanding General, Marine Corps Combat Development Command, Aviation Training Branch (C 462), 3300 Russell Rd, Quantico, VA 22134-5001.
4. Certification. Reviewed and approved this date.


T. S. JONES
By direction

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ENCLOSURE (1)

RECORD OF CHANGES

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Change Number	Date of Change	Date Entered	Signature of Person

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Chapter 1

MV-22 PILOT

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* * N O T E * *

Aircrew coordination will be briefed for all flights and aircrew positions.

**MARINE MEDIUM TILT-ROTOR SQUADRON - MV-22
UNIT TEMPLATE**

1. TABLE OF ORGANIZATION

PAA = 12 MV-22
28 Pilots
20 Crew Chiefs
19 Gunner/Observer

2. SQUADRON CORE CAPABILITY

a. A core capable squadron is able to sustain the following minimum performance on a daily basis during sustained contingency/combat operations, assuming 100% PAA, 90% in reporting status and 90% T/O on hand in all MOS's. If < 90%, core capability will be degraded by a like percentage. The extent to which a core capable squadron is able to surge beyond its core capability is situational dependent.

b. Within a 24-hour period, a core capable squadron is able to sortie 2 four plane divisions (or flight of eight) of mission capable aircraft crewed by NSQ aircrew on any mission essential task in a medium threat environment.

3. **BASIC AIRCREW QUALIFICATIONS.** As a minimum, in order to be considered Core Competent, a squadron must possess the following numbers of aircrew who are 100% complete in each listed core skill. (Note: If a squadron is < T/O, required numbers are reduced by a like %)

CORE SKILL	SQDN TOTAL PILOTS
CAL	16
FORM	16
EXT	16
VLAT	16
AG	16
DM	16
TAC	16
NS	16
AR	16
VIE	16
CQ	16

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4. **REQUIRED CORE SKILLS AND SORTIES.** As a minimum, in order to be considered core skills complete, an individual must complete the sorties listed in the table below. Initial aircrew must fly all sorties. Refresher aircrew, previously core skill complete in a specific core skill, at a minimum must complete the "R" coded sorties.

	CAL	FORM	VLAT	AG	EXT	DM	TAC	NS	AR	VIE	CQ	TOTAL
Initial	5	5	6	4	2	3	9	6	4	4	6	54
Refresher	3	3	4	3	1	2	5	4	2	1	6	34
T&R CODES	210	220	230	240	250	260	270	310	320	350	290	
	211	221	231	241	251	330	271	311	321	351	291	
	212	222	232	242		331	272	312	322	352	292	
	213	223	233	243			273	313	323	353	300	
	214	224	234				340	314			301	
			235				341	315			302	
							342					
							343					
							344					

5. **SORTIES REQUIRED TO MAINTAIN CORE SKILLS.** For each twelve month period after achieving competency, a pilot would be required to fly the following number of sorties in each skill area to maintain that competency. These values satisfy the refly factor for proficiency and maintain currency requirements.

	CAL	FORM	EXT	VLAT	AG	DM	TAC	NS	AR	VIE	CQ
PROFICIENCY	5	5	2	3	2	1	4	2	2	1	1
CURRENCY	NA	NA	NA	12	NA	NA	NA	12	NA	NA	12

6. **FLIGHT LEADER/INSTRUCTOR QUALIFICATIONS.** As a minimum, in order for a squadron to be considered Core Competent, it must possess the following numbers of aircrew in the listed flight leadership/instructor categories. (Note: If the squadron is < T/O, required numbers are reduced by a like %)

DESIGNATION	SQDN PILOT
TAC	12
SEC LDR	6
DIV LDR	4
FLT LDR	2
AMC	2
VLATI	6
DMI	2
NSI	4
WTI	1*
ACMI	2
AGI	2
*Shall be assigned as the squadron WTI	

7. **SORTIES REQUIRED TO QUALIFY FOR DESIGNATION AS FLIGHT LD/IP**

	TAC	SEC LDR	DIV LDR	FLT LDR	AMC	VLATI	DMI	ACMI	NSI	WTI
T&R CODES	390 391 392	393	394	602	603	IAW MAWTS-1 COURSE CATALOG	IAW MAWTS-1 COURSE CATALOG	IAW MAWTS-1 COURSE CATALOG	IAW MAWTS-1 COURSE CATALOG	IAW MAWTS-1 COURSE CATALOG

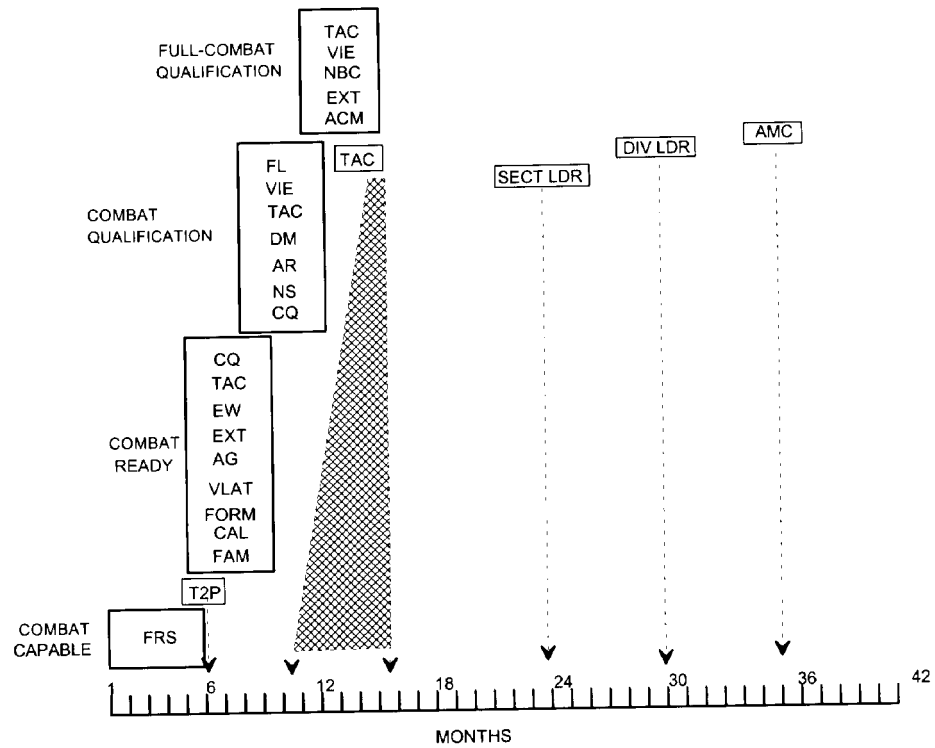


Fig 1-1..MV-22 Pilot's Notional Training Progression Model

100. PROGRAMS OF INSTRUCTION (POI) FOR BASIC AND TRANSITION PILOT

<u>WEEKS</u>	<u>COURSE/PHASE</u>	<u>ACTIVITY</u>
1-26	IMI/Combat Capable Phase	Training Squadron
26-33	Combat Ready Phase	Tactical Squadron
34-54	Combat Qualification Phase	Tactical Squadron
55-63	Full-Combat Qualification	Tactical Squadron

101. POI FOR REFRESHER PILOT

<u>WEEKS</u>	<u>COURSE/PHASE</u>	<u>ACTIVITY</u>
1-15	IMI/Combat Capable Phase	Training Squadron
16-21	Combat Ready Phase	Tactical Squadron
22-27	Combat Qualification Phase	Tactical Squadron
28-31	Full-Combat Qualification	Tactical Squadron

102. POI FOR MODIFIED REFRESHER PILOT

1-8	ISD/Combat Capable Phase Affects FRS only	Training Squadron
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110. GROUND TRAINING COURSES OF INSTRUCTION

<u>COURSE</u>	<u>ACTIVITY</u>
IMI	Training Squadron
Combined Service Support	Trng/Tact Squadron
Instrument School	Trng/Tact Squadron
Low Altitude Training	Trng/Tact Squadron
NITE Lab	Trng/Tact Squadron
Night Vision Goggles	Trng/Tact Squadron
SERE	Brunswick

111. AIRCREW TRAINING REFERENCES. Aircrews shall use the following references to ensure safe and standardized training and maintenance procedures, grading criteria, and aircraft operation:

OPNAVINST 3710.7	NATOPS General Flight and Operations
OPNAVINST 4790.2	Naval Aviation Maintenance Program
NAVAIR 00-80T-106	LHA/LPH/LHD NATOPS Manual
NWP-42	Shipboard Helicopter Operations Manual
NAVAIR 01-230-HMA-1	MV-22 NATOPS Flight Manual
MCO P3500.14	T&R Manual, Volume 1
MCO P4790.12	Individual Training Standards Systems (MATMEP)
MCO 3501.4	Marine Corp Combat Readiness and Evaluation System
MCO 3500.27/OPNAV 3500.39	Operational Risk Management

112. SQUADRON LEVEL TRAINING

MAWTS-1 Academic Support Package
Audiovisual Training
Pilot's Handbook
MV-22 NATOPS Flight Manual/OPNAVINST 3710.7
Map Reading Subsection of the Basic Officer's Extension Course
Instrument Procedures and Changes
Flight Safety
Intelligence
Survival
Weapons Qualification
Mission Planning
Rappel Operations
MV-22 Tactics Manual
Rope Suspension Training
Publications and Related Directives
Search and Rescue
Communication Procedures
Shipboard Operations and Procedures Fueling and Servicing
VLAT Introduction
Ground Handling
TRAP
Helicopter Loading/Equipment Storage
Tactical Briefing/Debriefing
Maint Procedures and Troubleshooting
AN/ALE-47 Programming (S)
Safety
APR-47 Trainer (15E36) (S)
Survival and First Aid
Helo ESM/ECM Equipment (S)
MV-22 FARP
Countering the FW Threats
External Operations
Countering Surface-to-Air Threats (S)
Helicopter Insertion/Extractions Ops.
Countering the RW Threat (S)
MAGTF Organization/Equipment
Helicopter Defensive Measures
MAGTF: The Amphibious Assault
NBC Threat (S)
Map Reading
Recognition Training
Night Vision Systems
Soviet Model IADS
Night Vision Techniques
Tactical Formation Maneuvering
Tactical Aircrew Coordination Considerations
Operational Risk Management

120. FLIGHT TRAINING FOR BASIC AND TRANSITION PILOT1. Combat Capable Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>	<u>CRP</u>
—	<u>ACFT/SIM</u>		
	<u>ACFT/SIM</u>		
Basic Qualification	--	--	25.0
Familiarization	9/14	14.5/28	5.4/8.2
Instruments	2/5	4.0/10.0	1.2/3.0
Confined Area Landings	2/2	3.0/4.0	1.2/1.2
Navigation	2/2	3.0/4.0	1.2/1.2
Tilt-Rotor Low Altitude Tactics	2/3	3.0/6.0	1.2/1.8
Formation	2/3	4.0/6.0	1.2/1.8
Externals	3/2	5.0/4.0	1.8/1.2
Combat Capable Check	2/2	3.5/3.0	1.8/1.6
TOTAL FOR PHASE	24/33	40.0/65.0	15.0/20.0
COMBINED TOTAL	57	105.0	60.0
TOTAL FOR BASIC POI	57	105.0	60.0

2. Combat Ready Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>	<u>CRP</u>
—	<u>ACFT/SIM</u>		
	<u>ACFT/SIM</u>		
Familiarization	1/2	1.5/3.0	0.2/0.4
Confined Area Landings	3/2	6.0/4.0	1.5/0.8
Formation	3/2	5.5/4.0	1.3/0.8
Tilt-Rotor Low Altitude Tactics	4/3	6.0/6.0	1.5/1.5
Aerial Gunnery	2/2	3.0/4.0	1.0/0.8
Externals	1/1	2.0/2.0	0.4/0.4
Electronic Warfare	0/1	0.0/2.0	0.0/0.4
Tactics	2/2	4.0/4.0	2.0/1.0
Carrier Qualification	2/1	3.0/2.0	0.7/0.3
TOTAL FOR PHASE	18/16	31.0/31.0	8.6/6.4
COMBINED TOTAL	34	62.0	15.0
TOTAL FOR BASIC POI	91	167.0	75.0

3. Combat Qualification Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>	<u>CRP</u>
	<u>ACFT/SIM</u>		
	<u>ACFT/SIM</u>		
Carrier Qualification	3/0	4.5/0.0	1.5/0.0
Night Systems	3/3	4.5/6.0	3.0/3.0
Aerial Refueling	2/2	3.0/3.0	1.0/1.0
Defensive Measures	1/1	1.5/2.0	1.0/0.5
Tactics	2/3	6.0/6.0	2.0/3.0
Tilt-rotor Insertion/Extraction	3/1	5.0/2.0	1.2/0.3
Flight Leadership	5/0	7.5/0.0	2.5/0.0
TOTAL FOR PHASE	19/10	32.0/19.0	12.2/7.8
COMBINED TOTAL	29	51.0	20.0
TOTAL FOR BASIC POI	120	218.0	95.0

4. Full-Combat Qualification Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>	<u>CRP</u>
<u>ACFT/SIM</u>			
Air Combat Maneuvering	2/6	2.0/6.0	0.7/1.2
Externals	1/2	1.0/3.0	0.3/0.6
Nuclear, Biological, and Chemical	1/2	1.0/2.0	0.4/0.4
Tilt-rotor Insertion/Extraction	2/0	3.0/0.0	0.6/0.0
Tactics	1/1	3.0/2.0	0.4/0.4
TOTAL FOR PHASE	7/11	10.0/13.0	2.4/2.6
COMBINED TOTAL	18	23.0	5.0
TOTAL FOR BASIC POI	138	241.0	100.0

121. FLIGHT TRAINING FOR REFRESHER PILOT1. Combat Capable Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>
<u>ACFT/SIM</u>		
Familiarization	4/7	6.5/14.0
Instruments	2/2	4.0/4.0
Confined Area Landings	2/1	3.0/2.0
Navigation	2/0	3.0/0.0
Tilt-Rotor Low Altitude Tactics	2/1	3.0/2.0
Formation	1/1	2.0/2.0
Externals	2/0	3.5/0.0
Combat Capable Check	2/1	3.5/1.0
TOTAL FOR PHASE	17/13	28.5/25.0
COMBINED TOTAL	30	53.5
TOTAL FOR REFRESHER POI	30	53.5

2. Combat Ready Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>
<u>ACFT/SIM</u>		
Confined Area Landings	2/1	4.0/2.0
Formation	2/1	3.5/2.0
Tilt-Rotor Low Altitude Tactics	2/2	3.0/4.0
Aerial Gunnery	2/1	3.0/2.0
Externals	1/0	2.0/0.0
Electronic Warfare	0/1	0.0/2.0
Tactics	2/0	4.0/0.0
Carrier Qualification	2/1	3.0/2.0
TOTAL FOR PHASE	13/7	22.5/14.0
COMBINED TOTAL	20	36.5
TOTAL FOR REFRESHER POI	50	90.0

3. Combat Qualification Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>
<u>ACFT/SIM</u>		
Carrier Qualification	3/0	4.5/0.0
Night Systems	3/1	4.5/2.0

Aerial Refueling	2/0	3.0/0.0
Defensive Measures	0/1	0.0/2.0
Tactics	2/1	6.0/2.0
Tilt-rotor Insertion/Extraction	0/1	0.0/2.0
TOTAL FOR PHASE	10/4	18.0/8.0
COMBINED TOTAL	14	26.0
TOTAL FOR REFRESHER POI	64	116.0

4. Full-Combat Qualification Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURL</u>
Air Combat Maneuvering	0/6	0.0/6.0
Externals	0/1	0.0/2.0
Nuclear, Biological, and Chemical	0/2	0.0/2.0
Tactics	1/0	3.0/0.0
TOTAL FOR PHASE	1/9	3.0/10.0
COMBINED TOTAL	10	13.0
TOTAL FOR REFRESHER POI	74	129.0

122. FLIGHT TRAINING FOR MODIFIED REFRESHER PILOT

1. Combat Capable Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>
Familiarization	2/5	3.0
Instruments	1/1	2.0/2.0
Confined Area Landings	1/0	1.5/0.0
Navigation	1/1	1.5/2.0
Tilt-Rotor Low Altitude Tactics/		
Terrain Flight	1/0	1.5/0.0
Formation	0/1	0.0/2.0
Externals	0/2	0.0/4.0
Combat Capable Check	1/1	2.0/1.0
TOTAL FOR PHASE	7/11	8.5/11.0
TOTAL FOR MODIFIED REFRESHER POI	18	22.5

123. FLIGHT TRAINING FOR INSTRUCTOR TRAINING

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>
Familiarization	1/1	1.0/2.0
Instruments	0/1	0.0/2.0
Confined Area Landings	1/1	1.5/2.0
Navigation	0/1	0.0/2.0
Tilt-Rotor Low Altitude Tactics/		
Terrain Flight	1/0	2.0/0.0
Formation	0/1	0.0/2.0
Externals	1/1	1.5/2.0
Standardization Check	0/1	0.0/2.0
TOTAL FOR INSTRUCTOR TRAINING POI	4/7	6.0/14.0

124. FLIGHT TRAINING FOR REQUIREMENTS, QUALIFICATIONS, DESIGNATIONS

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>
<u>ACFT/SIM</u>		
RQD	5/0	8.5/0.0
TOTAL FOR RQD	5	8.5

130. SIMULATOR TRAINING

1. Full Flight Simulator (FFS)/Flight Training Device (FTD)

a. The Full Flight Simulator (FFS) or Flight Training Device (FTD) shall be used in those events designated by an "S" in the event header. The specific simulator (FFS or FTD) is designated in each event header. This is the minimum simulator required to conduct the event. If the event is designated to be conducted in the FTD it may also be conducted in the FFS if it is available. If the event is a FFS designated event it may not be conducted in the FTD.

b. Demonstration and exercise modes of the flight simulator shall be utilized within the training syllabus.

c. If the flight simulator is not available, simulator periods should be flown in the aircraft.

2. Crew coordination shall always be stressed in training of all pilots. In all cases, there shall be a primary and secondary pilot training mission, although only one pilot shall be evaluated at any time.

131. EVENT TRAINING NOMENCLATURE. Per T&R Manual Volume 1 the following nomenclature is used to differentiate aircraft and simulator events. The aircraft is used for those events designated with an "A" and the flight simulator is used for those events designated with an "S" in the event header. To give commanding officers the maximum amount of flexibility for training, some events allow for the optional use of simulators or aircraft. Those types of events will use the designator "A/S" for aircraft preferred, simulator optional and "S/A" for simulator preferred, aircraft optional.

140. FLIGHT/SIMULATOR PERFORMANCE REQUIREMENTS

1. Purpose. To become familiar with aircraft limitations, operating procedures, and emergency procedures; demonstrate knowledge of NATOPS, local course rules, and safety regulations pertinent to flight operations. To develop and maintain the pilot's tactical proficiency and knowledge.

2. General

a. This manual generalizes mission guidance to allow for local conditions and to allow this manual to remain unclassified. CMC(A) and CG MCCDC encourage squadrons to use the full range of tactics contained in the tactical manuals and adopt the latest developed and proven tactics.

b. Compliance with written event description is mandatory for syllabus event completion. In the absence of a flight simulator, completion of a syllabus event is not required to complete that stage. Completion of those events should be accomplished as soon as practicable upon simulator availability. Should the command desire, simulator events can be flown as aircraft flight events for T&R credit. ACT will be stressed and evaluated throughout all training.

c. All flights shall terminate with a comprehensive debrief with emphasis on the aircrew's performance using all evaluation techniques.

d. Pilots shall fly events annotated with an "N" or "NS" at least 30 minutes after official sunset.

e. Pilots shall fly events annotated with an "NS" with night vision devices. Events annotated with "(N)" are night optional. Events annotated with "(NS)" may be flown in the day or using NVDs at night.

3. Syllabus Assignment

a. Basic and Transition pilots will be assigned to fly the entire syllabus. Conversions, Refreshers, and Modified Refreshers will fly the flights designated by a "C", "R", or "M" respectively in the flight description.

b. Refresher Syllabus. The refresher syllabus is predicated on the experience of the refresher pilot. A pilot in the refresher syllabus should fly all "R" coded events. However, a refresher pilot need not fly every event within a stage of training to be requalified in that stage. The unit commanding officer may tailor the refresher syllabus to fit the experience of the refresher pilot per T&R Manual, Volume 1. When the "R" coded events within a stage of training are complete, the pilot may be credited with the CRP for the entire stage of training. This assumes that the refresher has had previous proficiency in that stage of training. If the refresher pilot has no previous proficiency in a stage or particular event, then the refresher should fly the entire stage or all events not previously flown.

(1) A modified refresher syllabus for personnel out of the cockpit for 16-24 months can be individually tailored as specified by the commanding officer of the FRS, however, in no case will this syllabus be less than the minimum modified refresher syllabus shown here. Following the FRS, the refresher's syllabus will be established by the tactical squadron. It will be based upon the refresher syllabus but may be modified by the squadron commanding officer.

(2) The refresher syllabus applies only up to the stage achieved during the prior tour, after that the pilot will complete the entire remaining syllabus.

4. Aircrew Evaluation Flights. All pilots shall have an evaluation form filled out upon completion of the following:

a. NATOPS Check (CCX-193, RQD-600). A designated NATOPS instructor or an assistant NATOPS instructor shall evaluate RQD-600.

b. Instrument Check (INST-135, RQD-601). A member of the squadron instrument board shall evaluate RQD-601.

5. Integrated Multimedia Instruction (IMI). All pilots shall complete assigned IMI lessons prior to completion of the FAM stage. In addition all Replacement Aircrew (RACs, Refs, etc.) shall attend the FREST Pilot Familiarization course except as waived by the Fleet Readiness Squadron (FRS) Commanding Officer.

6. Crew Position Designator. Basic pilots shall fly in the left seat through the combat capable phase and combat ready phase of training. Refresher and conversion pilots should fly in the left seat for combat capable training and right seat for combat ready training whenever possible.

7. Aircrew Training Forms (ATFs)

a. An ATF is required for any initial event completed by a Basic, Conversion, Transition, Refresher pilot or as recommended by the Squadron Standardization Board.

b. If the commanding officer has waived a syllabus event, the squadron training officer shall place a waiver letter in section 3 of the APR.

8. Instructor Requirements

a. The instructor requirement is noted at the right margin of each event. If the instructor is not listed for the event, then the minimum requirement is a Tilt-rotor Aircraft Commander (TAC) proficient and current in the event to be instructed.

b. Simulator Events

(1) For Combat Capable simulator events, the minimum instructor requirement is a Certified Simulator Instructor (SIMI), the requirement for an FRS Instructor Pilot in addition to the Certified Simulator Instructor is at the discretion of the squadron commanding officer. An Instructor Pilot may replace a SIMI for any instructional event. Except for FAM-100, FAM-101 and the Instrument stage, Combat Capable simulator events are designed so that the SIMI (or IP) is instructing from one of the pilot seats. Once certified and designated by the FRS Commanding Officer, the Simulator Instructor may instruct any Combat Capable simulator event to include VLAT and Night Systems events.

(2) A squadron Instructor Pilot is required for Combat Ready, Combat Qualification and Full-Combat Qualification simulator events. The type of squadron IP required is contained in the right margin of the event header. If the event header contains no instructor requirement, then the minimum requirement is a Tilt-rotor Aircraft Commander (TAC) proficient and current in the event to be instructed.

c. Flight Events

(1) For Combat Capable flight events, the minimum instructor requirement is an FRS Instructor Pilot. An Instructor Pilot, once certified by the FRS Commanding Officer, may instruct any day and night unaided Combat Capable flight event. The FRS IP will be certified in accordance with the syllabus contained in paragraph 150 of this chapter. To instruct NVD events the IP must be designated a Night Systems Familiarization Instructor (NSFI) by the FRS Commanding Officer or a designated Night Systems Instructor (NSI). The NSFI and NSI requirements are contained in the MAWTS-1 Course Catalog.

(2) The type of squadron IP required for Combat Ready, Combat Qualification, and Full-Combat Qualification is contained in the right margin of the event header. If the event header contains no instructor requirement, then the minimum requirement is a Tilt-rotor Aircraft Commander (TAC) proficient and current in the event to be instructed.

9. Event Completion. Compliance with the written event description is mandatory for syllabus event completion. Times indicated for each event are only recommendations.

10. Weight and Balance. MPS will be the primary method used to complete weight and balance sheets, with paper products as the alternate, per NATOPS guidelines and Standing Operating Procedures.

11. Crew Requirements/Position Designations. Crew requirements are listed for each stage of training.

12. Sequence. Training should be accomplished by flying events within a stage in sequence and stages in sequence when practical.

13. Definitions

a. Discuss

(1) The IP shall discuss a procedure or maneuver during the brief, in flight, or debrief.

(2) The PUI is responsible for knowledge of the applicable procedures prior to the briefing.

b. Demonstrate

(1) The IP performs the maneuver with accompanying description.

(2) The PUI observes the maneuver and is responsible for the knowledge of the procedures prior to the flight.

c. Introduce

(1) At his option, the IP may perform the maneuver with an accompanying description, or he may coach the PUI through the maneuver without demonstration.

(2) The PUI shall perform the maneuver with coaching as necessary and is responsible for knowledge of the procedures prior to the flight.

d. Review

(1) The IP observes and grades the maneuver without coaching the PUI. An airborne critique of the PUI's performance is at the option of the instructor.

(2) The PUI is expected to perform the maneuver without coaching and devoid of procedural error at a level acceptable to warrant progress into the next stage of training.

14. Aircrew Coordination. Aircrews shall brief techniques of aircrew coordination for all flights and/or events.

15. Operational Risk Management. Aircrews will brief those factors that affect risk mitigation decisions for every flight or mission.

141. COMBAT CAPABLE PHASE

1. Purpose. To develop a combat capable co-pilot. At the completion of this phase the PUI will be a NATOPS qualified T2P and rate the 7532 MOS as specified in the CCX-193.

2. Familiarization (FAM)

a. Purpose. To develop familiarity with aircraft flight characteristics, limitations, and emergency procedures. To develop proficiency in all maneuvers and to instill basic aircrew coordination behaviors throughout the familiarization stage.

b. General. All flights will terminate with an instrument approach when practicable. During all stages, the pilot under instruction (PUI) shall complete a weight and balance form before each flight and present it to the instructor pilot for verification.

c. Crew requirements. SFAM-100 and 101: Instructor Pilot not required in cockpit seat. Events can be conducted using two RACs or PUIs.

d. Prerequisites. NITE lab complete prior to any event using NVGs or FLIR.

e. Ground Training. NAMO, course rules brief, MAWTS-1 NVD courses, NITE lab (includes Night Vision Systems, N.S. Human Factors, Night Environment ASPs, FLIR Introductory, and LASER Safety), Introduction to Night Systems Training (ASP-U), FAM stage lectures, and/or Interactive Course Ware.

e. Simulator Training. (14 Events, 28.0 Hours).

f. Flight Training. (9 Flights, 14.5 Hours).

SFAM-100	2.0	R,M S(CPT)	SIMI or IP
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Goal. Introduce Cockpit preflight, basic CMS functionality and aircraft start-up and shutdown procedures.

Requirement(1) Discuss

- (a) Capabilities and limitations of the FTD.
- (b) Cockpit layout, controls and checklist.
- (c) Digital information vs analog information.
- (d) Battery operations and APU starting procedures.
- (e) Basic CMS functionality.

1 Major components of the CMS (to include avionics busses and interface units).

2 Human interface (input/manipulation of information).

3 CMS power-up configuration.

4 MFD's, CDU/EICAS and Multi Function Keyboard.

5 Crew Alerting System (W/C/A's, voice warning, color/priority logic, ASIs and OIDs).

6 Communications internal (ICS) and external (AN/ARC-210 normal modes and functions).

(f) Engine start-up and shutdown procedures.

(g) Blade fold wing stow system/procedures.

(h) Aircrew coordination.

(i) MPS utilization.

(2) Introduce

(a) Cockpit preflight and checklist procedures.

(b) Battery operations, APU start and CMS power-up.

(c) Engine start-up and shutdown procedures.

(d) Communication procedures (Internal/External).

(e) Blade fold wing stow procedures.

Prerequisite. VMMT-204 IMI program task____.

SFAM-101

2.0

R S(CPT)

SIMI or IP

Goal. Review Cockpit preflight, basic CMS functionality and aircraft start-up and shutdown procedures. Introduce ground emergencies.

Requirement

(1) Discuss

(a) Engines and related systems.

1 Major assemblies of the T406-AD-400.

2 FADEC, FPMU, PMA.

3 TPMS.

4 Engine control panel.

5 Engine starting, ignition and oil systems.

(b) APU.

(c) Engine limitations.

- (d) Engine W/C/A's.
- (e) Basic CMS functions (COMM, ENAV and IFF, with MPS considerations).
- (f) Ground emergencies.
- (g) Aircrew coordination.

(2) Introduce

- (a) Basic CMS functions (COMM, ENAV and IFF).
 - 1 COMM plan upload, CDU/EICAS, RFIS and radio select panel use.
 - 2 Tune and identify TACAN station and select TACAN needle.
 - 3 Tune and identify VOR station and select VOR needle.
 - 4 IFF mode 3A/3C operations.
- (b) W/C/A's (those associated with the emergencies of this event).

(3) Review

- (a) Cockpit preflight and checklist procedures.
- (b) Battery operations, APU start and CMS power-up.
- (c) Engine start-up and shutdown procedures.
- (d) Communication procedures.
- (e) Blade fold wing stow procedures.

(4) Emergencies

- (a) Emergency egress on the ground.
- (b) Emergency shutdown.
- (c) APU fail/no APU shutdown.
- (d) Rotor brake failure.
- (e) Nacelle/IR suppresser fire on the ground.
- (f) Wing fire.
- (g) BFWS sequence fail.

Prerequisite. VMMT-204 IMI program task_____.

SFAM-102 2.0 S(FFS) C
Goal. Introduce ground taxi and low work. Demonstrate takeoff
emergencies.

Requirement

(1) Discuss

- (a) Capabilities and limitations of the FFS.
- (b) Engines and related systems (continued from AFAM-101).
 - 1 Nacelle air management system.
 - 2 IR suppression/exhaust deflection system.
 - 3 Engine monitoring system.
 - 4 Engine and related systems W/C/A's.
 - 5 Engine displays and CMS information.
- (c) Ground taxi operations.
- (d) Low work (demonstrate/introduce events).
- (e) Utilization of MPS & NATOPS Manual to determine performance data.
- (f) Use of the nacelle trim switch.
- (g) Nacelle angle/nose attitude relationship in the hover, "hover nacelle."
- (h) TCL vs Collective.
- (i) HIGE/HOGE.
- (j) Flight displays and symbology.
- (k) Takeoff emergencies.
- (l) Aircrew coordination.

(2) Demonstrate/Introduce

- (a) All required checklists.
- (b) Normal ground taxi (power steering on and off).
- (c) Rearward ground taxi.
- (d) Vertical takeoff to a hover.
- (e) Power assurance check.

(f) Precision hover (level nose, nose high/low and level nose at various altitudes).

(g) Air taxi.

1 Forward, left and right.

2 Rearward with nacelles.

3 Rearward with cyclic to show adverse effects (demonstrated only).

(h) Hover turns.

(i) Square patterns.

(j) Vertical landing from the hover.

(k) W/C/A's (those associated with the emergencies of this flight).

(3) Review

(a) Cockpit preflight and checklist procedures.

(b) Aircraft start-up and shutdown procedures.

(c) Basic CMS proficiency.

(d) Previous ground emergencies.

(4) Emergencies. Single engine failure, hover.

Prerequisite. VMMT-204 IMI program task_____.

SFAM-103 2.0

S(FFS)

SIMI or IP

Goal. Review low work and ground emergencies. Introduce forward flight (conversion mode) and takeoff emergencies.

Requirement

(1) Discuss

(a) VMS basic architecture/overview.

(b) #1 and #2 Hydraulic systems (basic knowledge, covered in more detail during FAM-112).

(c) Flight control system PFCS.

1 FCCs.

2 PFCS operation.

3 PFCS fail/reset light.

4 Mechanical flight controls.

- 5 Electro-hydraulic controls.
- 6 Flight control laws (CLAWS).
- 7 TCLS.
- 8 Conversion protection system "Conversion Corridor."
- 9 PFCS W/C/A's.

- (d) Transition to forward flight from the hover.
- (e) Power adjustments during transitions from hover to forward flight and approach to hover.
- (f) Flight characteristics during level flight, turns, climbs, descents and level speed changes.
- (g) Flight characteristics during nacelle rotation, nacelle angle/airspeed relationship.
- (h) Normal landing pattern.
- (i) Normal approach to a hover.
- (j) Single engine takeoff/in-flight emergencies.
- (k) Aircrew coordination.

(2) Demonstrate/Introduce

- (a) All required checklists.
- (b) Transition to forward flight from the hover.
- (c) Normal landing pattern.
- (d) Normal approach to a hover.
- (e) Level speed changes.
- (f) W/C/A's (those associated with the emergencies of this flight).

(3) Review

- (a) Ground taxi operations.
- (b) Low work (introduced events from SFAM-102).

(4) Evaluate

- (a) Checklist procedures.
- (b) Basic CMS proficiency.
- (c) Previous emergencies.

(d) Flight preparation and system knowledge.

(5) Emergencies

(a) Single engine failure aborted takeoff.

(b) Single engine failure non-aborted takeoff.

(c) Single engine failure, VTOL transition (land back not possible).

(d) Tire/wheel failure.

(e) Single engine failure in-flight.

(f) Engine emergency restart in-flight.

Prerequisite. VMMT-204 IMI program task_____.

SFAM-104

2.0

S(FFS)

SIMI or IP

Goal. Introduce conversion mode maneuvers.

Requirement

(1) Discuss

(a) VMS basic architecture/overview (continued from SFAM-103).

(b) AFCS.

1 Flight control panel.

2 Full time and selectable modes of operation.

3 Flight director panel (HDG, SPEED, ALT, HVR ALT and CPLD functions only).

4 Cyclic grip and TCL switches (AFCS unique).

5 CDU default pages (AFCS unique).

6 AFCS DISENGAGE caution and AFCS FAULT advisory.

(c) STO (60, 70, and 75 degrees nacelle settings).

(d) Running landing.

(e) Steep approach.

(f) No hover landing.

(g) Use/limitations of OBOGS.

(h) Aircrew coordination.

(2) Demonstrate/Introduce

- (a) STO (60, 70, and 75 degrees nacelle settings).
- (b) Running landing.
- (c) Steep approach.
- (d) No hover landing.
- (e) W/C/A's (those associated with the emergencies of this flight).

(3) Review

- (a) Transition to forward flight (from the hover).
- (b) Normal landing pattern.
- (c) Normal approach to a hover.
- (d) Level speed changes.
- (e) Single engine takeoff/in-flight emergencies.

(4) Evaluate

- (a) Checklist procedures.
- (b) Basic CMS proficiency.
- (c) Low work (introduced events from SFAM-102).
- (d) Ground taxi operations.
- (e) Previous emergencies.
- (f) Flight preparation and system knowledge.

(5) Emergencies

- (a) In-flight fire.
 - 1 Engine fire.
 - 2 Wing fire.
 - 3 Cockpit or cabin fire.
- (b) Smoke and fume elimination.
- (c) Single engine waveoff.
- (d) Single engine landing.

Prerequisite. VMMT-204 IMI program task_____.

SFAM-1052.0S(FFS)SIMI or IP

Goal. Review conversion mode maneuvers. Demonstrate transitions and conversions between modes of flight. Demonstrate pitch-up side slip characteristics.

Requirement

(1) Discuss

(a) Drive/Proprotor systems.

1 MWGB.

2 TAGB.

3 PRGB.

4 Gearbox oil systems/Emergency Lube System (ELS).

5 Drive System Interface Unit (DSIU).

(b) ICDS.

(c) Use of interim power.

(d) Max gross takeoff (from hover) and landings.

(e) Level transition to airplane mode (Descending Tendencies).

(f) Level conversion to conversion mode (Ballooning Tendencies).

(g) Airspeed gates to convert (220/200 knots).

(h) AFCS off flight.

(i) Aircrew Coordination.

(2) Demonstrate/Introduce

(a) Level transition to airplane mode.

(b) Level conversion to conversion mode (60 degree nacelle).

(c) Use of interim power.

(d) Max gross takeoff (from hover) and landings.

(e) AFCS off flight (conversion mode only).

(f) Pitch-up side slip characteristics.

(g) W/C/A's (those associated with the emergencies of this flight).

(3) Review

- (a) STO (60, 70, and 75 degrees nacelle settings).
- (b) Running landing.
- (c) Steep approach.
- (d) No hover landing.
- (e) Single engine Waveoff/Landing.

(4) Evaluate

- (a) Transition to forward flight.
- (b) Normal landing pattern.
- (c) Normal approach to a hover.
- (d) Level speed changes (conversion mode).
- (e) Single engine takeoff/in-flight emergencies.

(5) Emergencies

- (a) Engine Cautions.
 - 1 Engine Np Overspeed.
 - 2 Engine Ng Overspeed.
 - 3 Engine hot.
 - 4 Engine overtorque.
 - 5 Engine surge/compressor stall.
 - 6 Engine oil pressure low.
 - 7 Engine oil quantity.
 - 8 Engine chips.
 - 9 Engine MGT high.
 - 10 Nacelle blower failure.

Prerequisite. VM MT-204 IMI program task_____.

SFAM-106

2.0

S (FFS)

SIMI or IP

Goal. Introduce airplane mode flight.

Requirement(1) Discuss

- (a) Drive/Proprotor systems (continued).
 - 1 Rotating controls.
 - 2 Pendulum damper assembly.
 - 3 Spinner.
 - 4 Proprotor system sensors.
 - 5 Drive system W/C/A's.
 - 6 Drive system displays/CMS information.
 - (b) Utility hydraulic system (basic function and system components).
 - (c) Landing gear system.
 - (d) Transition/conversion procedures.
 - (e) Proprotor/Nr efficiency in airplane mode.
 - (f) Transition/conversion rates versus cyclic migration.
 - (g) Loss/gain of altitude characteristics during transitions/conversions.
 - (h) Aircraft trim (P. A. T. principles).
 - (i) Aircrew coordination.
- (2) Demonstrate
- (a) Level speed changes.
 - (b) Climbs and descents at various airspeeds.
 - (c) Turns up to 30 degrees AOB at various airspeeds.
- (3) Introduce
- (a) Level transition to airplane mode (1000 feet AGL min).
 - (b) Aircraft trim.
 - (c) Level speed changes.
 - (d) Climbs and descents at various airspeeds.
 - (e) Turns up to 30 degrees AOB at various airspeeds.
 - (f) Level conversion (1000 feet AGL min).
 - (g) AFCS off (airplane mode).
 - (h) W/C/A's (those associated with the emergencies of this flight).

(4) Review

- (a) Max gross takeoff (from hover) and landings.
- (b) AFCS off flight (conversion mode).
- (c) Pitch-up side slip characteristics.

(5) Evaluate

- (a) STO.
- (b) Running landing.
- (c) Steep approach.
- (d) No hover landing.
- (e) Single engine Waveoff/Landing.

(6) Emergencies

- (a) Drive systems cautions.
 - 1 RPM LOW Warning.
 - 2 RPM HIGH (Nr 105% and above).
- (b) PRGB cautions.
- (c) TAGB cautions.
- (d) MWGB cautions.

Prerequisite. VMMT-204 IMI program task_____.

SFAM-107 2.0

R S (FFS)

SIMI or IP

Goal. Introduce airplane mode maneuvers (continued from SFAM-106).

Requirement

(1) Discuss

- (a) Fuel system.
 - 1 Fuel Management Unit (FMU).
 - 2 Fuel system configuration.
 - 3 Fuel flow, normal operations.
 - 4 Fuel flow, manual fuel transfer.
 - 5 Fuel flow, AR/HIFR.

- (b) Transition to airplane mode from takeoff (Attention to descending tendencies).
 - (c) Emergency descent in airplane mode.
 - (d) Landing pattern entry in airplane mode.
 - (e) Attitude versus rate control by AFCS.
 - (f) Pitch limiting (control laws).
 - (g) Conversion Corridor.
 - (h) CDU back-up using MFD.
 - (i) DEU failure.
 - (j) Aircrew coordination.
- (2) Demonstrate/Introduce
- (a) Transition to airplane mode from takeoff.
 - (b) Emergency descent in airplane mode.
 - (c) Landing pattern entry in airplane mode.
 - (d) Attitude versus rate control by AFCS.
 - (e) Pitch limiting.
 - (f) CDU back-up using MFD.
 - (g) DEU failure.
 - (h) W/C/A's (those associated with the emergencies of this flight).
- (3) Review
- (a) Level transition to airplane mode (1000 feet AGL min).
 - (b) Aircraft trim.
 - (c) Level speed changes.
 - (d) Climbs and descents at various airspeeds.
 - (e) Turns up to 30 degrees AOB at various airspeeds.
 - (f) Level conversion (1000 feet AGL min).
- (4) Evaluate
- (a) Max gross takeoff from a hover and max gross landings.
 - (b) AFCS off flight.

(5) Emergencies

- (a) Fuel system cautions.
 - 1 Bypass cautions.
 - 2 Fuel quantity low cautions.
 - 3 Fuel venting.
 - 4 Fuel Management Unit (FMU) failure.
- (b) Inadvertent IMC.
- (c) Cabin door open.

Prerequisite. VMMT-204 IMI program task_____.

SFAM-108 2.0 R S (FFS) SIMI or IP

Goal. Introduce slow flight airplane mode maneuvers, high AOB turns, power on and off stalls and appropriate engine failures.

Requirement(1) Discuss

- (a) Fuel system (continued).
 - 1 Fuel dump system.
 - 2 Ground Refuel/Defuel Panel (GRDP).
 - 3 Fuel system W/C/A's.
 - 4 Fuel system displays/CM information.
- (b) Slow flight characteristics in airplane mode.
- (c) Weight/CG requirements in airplane mode.
- (d) Stall speeds versus angle of bank.
- (e) Aircraft stall characteristics and recovery procedures.
- (f) Practice power on/off stall procedures.
- (g) Dual engine failure procedures in conversion and airplane modes.
- (h) Aircrew coordination.

(2) Demonstrate/Introduce

- (a) Slow flight in airplane mode.
- (b) High AOB turns in airplane mode (60 degrees AOB).

- (c) Practice power on/off stalls.
 - (d) Dual engine failure procedures in conversion and airplane modes.
 - (e) W/C/A's (those associated with the emergencies of this flight).
- (3) Review
- (a) Transition to airplane mode from takeoff.
 - (b) Emergency descent in airplane mode.
 - (c) Landing pattern entry in airplane mode.
- (4) Evaluate
- (a) Level transition to airplane mode (1000 feet AGL min).
 - (b) Aircraft trim.
 - (c) Level speed changes.
 - (d) Climbs and descents at various airspeeds.
 - (e) Turns up to 30 degrees AOB at various airspeeds.
 - (f) Level conversion (1000 feet AGL min).
- (5) Emergencies
- (a) Engine FADEC cautions.
 - 1 Dual FADEC failure.
 - 2 Engine FADEC limiting.
 - 3 Single FADEC failure.
 - 4 Loss of engine control system data.
 - 5 FADEC auto transfer failure.
 - 6 FADEC manual transfer failure.
 - 7 FADEC backup power failure.
 - (b) Engine motoring (starter engagement parameters).
 - (c) Bellows failure.
 - (d) Emergency descent.
 - (e) Dual engine failure landing.
 - (f) Crash landing.

Prerequisite. VMMT-204 IMI program task_____.

SFAM-109

2.0

R,M S(FFS)

SIMI or IP

Goal. Review all airplane maneuvers to include slow flight (airplane mode), high AOB turns, power on and off stalls and dual engine failures. Introduce Flight Director.

Requirement

(1) Discuss

- (a) Electrical systems (AC).
 - 1 Generator Control Unit (GCU).
 - 2 Constant Frequency Generators (CFG).
 - 3 Variable Frequency Generators (VFG).
 - 4 FCC power sources.
 - 5 Six AC busses.
 - 6 Power distribution panels/AC power receptacles.
- (b) Flight director panel functionality.
- (c) Flight director cueing/flight director coupled modes.
- (d) Power cue versus mode of flight.
- (e) Auto nacelle.
- (f) Display fixation ("head down" tendencies).
- (g) Aircrew coordination.

(2) Introduce

- (a) Use of flight director and associated cueing in conversion mode.
- (b) Use of flight director and associated cueing in airplane mode.
- (c) Use of flight director and associated cueing during transitions and conversions.
- (d) Coupled modes.
- (e) W/C/A's (those associated with the emergencies of this flight).

(3) Review

- (a) Slow flight in airplane mode.

- (b) High AOB turns in airplane mode.
- (c) Practice power on/off stalls.
- (d) Dual engine failure procedures in conversion and airplane modes.

(4) Evaluate

- (a) Transition to airplane mode from takeoff.
- (b) Basic maneuvers in airplane mode.
- (c) Emergency descent in airplane mode.
- (d) Landing pattern entry in airplane mode.

(5) Emergencies

- (a) SDC failure.
- (b) Electrical system cautions.
 - 1 Bus failure.
 - 2 GEN 1 and GEN 2 fail.
 - 3 GEN 3 and GEN 4 fail.

Prerequisite. VMMT-204 IMI program task_____.

<u>SFAM-110</u>	<u>2.0</u>	<u>R,M S(FFS)</u>	<u>SIMI or IP</u>
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Goal. Simulator stage progress check. Introduce hydraulic and flight control emergencies.

Requirement. Review everything in stage.

Emergencies

- (1) Hydraulic system cautions.
- (2) Flight control cautions.
- (3) Converter 1/2/3 failures.

FAM-111	1.5	A(MV-22)	IP
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Goal. Introduce start-up/shutdown, ground operations, emergencies and low work.

Requirement

(1) Discuss

- (a) Electrical systems (DC)
 - 1 Aircraft battery/Battery control system.

- 2 Rectifier Converter Unit (RCU).
- 3 Six DC busses.
- 4 Integrated Wiring System (IWS)/Wiring Interface Assemblies (WIA).
- 5 Generator cooling.
- 6 Electrical W/C/A's.
- 7 Electrical displays/CMS information.
- (b) Ingress/Egress system.
- (c) Aircrew coordination.
- (2) Introduce
 - (a) Aircraft start-up and shutdown.
 - (b) Normal taxi (power steering on and off).
 - (c) Rearward taxi.
 - (d) Vertical takeoff to a hover.
 - (e) Power assurance check.
 - (f) Precision hover (level nose, nose high/low at various altitudes).
 - (g) Air taxi.
 - (h) Hover turns.
 - (i) Square patterns.
 - (j) Vertical landing from the hover.
 - (k) Transition to forward flight.
 - (l) Normal landing pattern.
 - (m) Level speed changes.
 - (n) Normal approach.
 - (o) W/C/A's (those associated with the emergencies of this flight).
- (3) Review
 - (a) Aircraft preflight.
 - (b) CMS knowledge and proficiency for stage of training.
 - (c) Checklist procedures.

(d) Communication procedures.

(4) Emergencies

(a) Engine start malfunctions.

(b) Cockpit emergency egress on the ground.

(c) Emergency exits.

(d) Emergency shutdown.

(e) APU failure.

(f) Nacelle/IR suppresser fire on the ground.

(g) Single engine failure in a hover.

(h) Single engine failure aborted takeoff.

(i) Single engine failure non-aborted takeoff.

Prerequisite. SFAM-110. VMMT-204 IMI program task____.

FAM-112

1.5

A (MV-22)

IP

Goal. Review ground, low work, normal landing pattern procedures. Introduce conversion mode maneuvers in the landing pattern.

Requirement

(1) Discuss

(a) Hydraulic Systems.

1 Flight control actuators.

2 Hydraulic Power Drive Unit (HPDU).

3 Hydraulic control modules.

4 Switching/Isolation Valves.

5 Hydraulic swivel fittings.

6 Hydraulic oil cooler.

7 Hydraulic W/C/A's.

8 Hydraulic displays/CMS information.

(b) Environmental Control System (ECS).

(c) Aircrew coordination.

(2) Introduce

- (a) STO (60, 70, and 75 degrees nacelle settings).
 - (b) Running landing.
 - (c) Steep approach.
 - (d) No hover landing.
 - (e) Use of interim power.
 - (f) Max gross takeoff (from hover) and landings.
 - (g) AFCS off flight.
 - (h) Pitch-up side slip characteristics.
 - (i) Use of flight director symbology.
 - (j) W/C/A's (those associated with the emergencies of this flight).
- (3) Review
- (a) Ground taxi operations.
 - (b) Low work (introduced events from FAM-111).
 - (c) Normal landing pattern.
 - (d) Level speed changes.
 - (e) Single engine takeoff/in-flight emergencies.
- (4) Evaluate
- (a) Aircraft preflight.
 - (b) Communication procedures.
- (5) Emergencies
- (a) Hydraulic hot cautions.
 - (b) Hydraulic pressure low cautions.
 - (c) Hydraulic system high pressure cautions.
 - (d) Single HYD system failure.
 - (e) Dual HYD system failure.
 - (f) ECS failure.

Prerequisite. VMMT-204 IMI program task_____.

FAM-113

2.0

A(MV-22)

IP

Goal. Introduce airplane mode flight.

Requirement(1) Discuss

- (a) AN/ARC-210 (V) Radio and MPS considerations.
 - 1 HAVEQUICK modes and functions.
 - 2 SINCGARS modes and functions.
 - 3 Maritime modes and functions.
 - 4 SATCOM modes and functions.
 - 5 Remote control head.
- (b) AN/APX-100 IFF system and MPS considerations.
- (c) Pneumatic system.
- (d) Fire detection system.
- (e) Crash Survivable Memory Unit (CSMU).
- (f) Aircrew Coordination.

(2) Introduce. (Maneuvers in this section of the event are to be conducted twice. First, without flight director symbology and then with flight director symbology.)

- (a) Level transition to airplane mode (1000 feet AGL min).
- (b) Aircraft trim.
- (c) Level speed changes.
- (d) Climbs and descents at various airspeeds.
- (e) Turns up to 30 degrees AOB at various airspeeds.
- (f) Level conversion to conversion mode (1000 feet AGL min).
- (g) W/C/A's (those associated with the emergencies of this flight).

(3) Review

- (a) Conversion mode maneuvers in the landing pattern.
- (b) Use of flight director symbology.
- (c) AFCS off flight.
- (d) Pitch-up side slip characteristics.

(4) Evaluate

- (a) Ground taxi operations.
- (b) Low work.
- (c) Single engine takeoff/in-flight emergencies.

(5) Emergencies

- (a) Flight control cautions.
 - 1 AFCS fail/reset light on.
 - 2 Dual FCC failure.
 - 3 Dual ADS failure.
 - 4 Dual SWPL failure.
 - 5 Dual ACTR failure.
 - 6 Conversion actuator failure.
 - 7 Dual ELEV failure.
 - 8 Dual CFDA failure.
 - 9 Dual CKPT failure.

Prerequisite. VMMT-204 IMI program task_____.

FAM-114

1.5

A(MV-22)

IP

Goal. Introduce airplane mode maneuvers (continued from FAM-113).

Requirement

(1) Discuss

- (a) Ingress/Egress system.
- (b) Personnel equipment.
- (c) Emergency equipment.
- (d) Windshield wiper and washer system.
- (e) Aircrew Coordination.

(2) Introduce

- (a) Transition to airplane mode from takeoff (Attention to descending tendencies).
- (b) Emergency descent in airplane mode.
- (c) Landing pattern entry in airplane mode.

- (d) Attitude verses rate control by AFCS.
 - (e) Pitch limiting.
 - (f) CDU back-up using MFD.
 - (g) W/C/A's (those associated with the emergencies of this flight).
- (3) Review
- (a) Level transition to airplane mode (1000 feet AGL min).
 - (b) Aircraft trim.
 - (c) Level speed changes.
 - (d) Climbs and descents at various airspeeds.
 - (e) Turns up to 30 degrees AOB at various airspeeds.
 - (f) Level conversion (1000 feet AGL min).
 - (g) W/C/A's (those associated with the emergencies of this flight).
- (4) Evaluate
- (a) Conversion mode maneuvers in the landing pattern.
 - (b) Use of flight director symbology.
 - (c) AFCS off flight.
- (5) Emergencies
- (a) Flight control cautions (continued).
 - 1 Single/Dual flapping sensor failure.
 - 2 Single/Dual XDCR failure.
 - 3 No response on PFCS.
 - 4 Single FCC failure.
 - 5 Miscellaneous flight control cautions.
 - 6 Single ACT failure.
 - 7 Nacelle control cautions.

Prerequisite. VMMT-204 IMI program task_____.

FAM-115

1.5

R A(MV-22)

IP

Goal. Introduce slow flight airplane mode maneuvers, high AOB turns, power on and off stalls and appropriate engine failures.

Requirement(1) Discuss

- (a) VSLED.
 - 1 Architecture/Overview.
 - 2 Airborne unit (AU).
 - 3 Vibration sensors.
 - 4 Hanger bearing transducers.
 - 5 Engine diagnostics.
 - 6 Rotor track and balance.
- (b) Rotor brake system.
- (c) Aircraft stall characteristics and recovery procedures.
- (d) Practice power on/off stall procedures.
- (e) Dual engine failure procedures in conversion and airplane modes.
- (f) Aircrew coordination.

(2) Introduce

- (a) Slow flight in airplane mode.
- (b) High AOB turns in airplane mode (>60 degrees AOB).
- (c) Practice power on/off stalls.
- (d) Dual engine failure procedures in conversion and airplane modes.
- (e) W/C/A's (those associated with the emergencies of this flight).

(3) Review

- (a) Transition to airplane mode from takeoff.
- (b) Emergency descent in airplane mode.
- (c) Landing pattern entry in airplane mode.

(4) Evaluate

- (a) Level transition to airplane mode (1000 feet AGL min).
- (b) Aircraft trim.
- (c) Level speed changes.

- (d) Climbs and descents at various airspeeds.
- (e) Turns up to 30 degrees AOB at various airspeeds.
- (f) Level conversion (1000 feet AGL min).
- (5) Emergencies
 - (a) Avionics cautions.
 - 1 Avionics bay hot.
 - 2 Single/Dual mission computer failure.
 - 3 Single/Dual DEU failure.
 - 4 ABIU, NIU, WIU failures.
 - (b) Rotor brake failure.
 - (c) Uncommanded rotor brake on.

Prerequisite. VMMT-204 IMI program task_____.

FAM-116 2.0 R A(MV-22) IP

Goal. Review all airplane maneuvers to include slow flight (airplane mode), high AOB turns, power on and off stalls and dual engine failures.

Requirement

- (1) Discuss
 - (a) Cargo provisions.
 - (b) Flight director/Coupled modes.
 - (c) Auto nacelle.
 - (d) Aircrew coordination.
- (2) Introduce
 - (a) Flight director/Coupled modes.
 - (b) W/C/A's (those associated with the emergencies of this flight).
- (3) Review
 - (a) Slow flight in airplane mode.
 - (b) High AOB turns in airplane mode.
 - (c) Practice power on/off stalls.
 - (d) Dual engine failure procedures in conversion and

- (b) Night adaptation/visual effects.
- (c) Night scanning techniques.
- (d) Fixation tendencies.
- (e) Radar altimeter low setting.
- (f) Use of hover display.
- (g) Use of flight director/coupled modes.
- (h) Prelaunch communications with light signals.
- (i) Aircrew coordination.

(2) Introduce

- (a) Low work.
- (b) Transition to forward flight (from the hover).
- (c) Normal landing pattern.
- (d) Normal approach.
- (e) STO (60, 70, and 75 degrees nacelle as directed).
- (f) Running landing.
- (g) Steep approach.
- (h) No hover landing.
- (i) Transition to airplane mode from takeoff (Attention to descending tendencies).
- (j) Landing pattern entry in airplane mode.
- (k) Use of flight director/coupled modes.
- (l) Use of hover display.
- (m) AFCS off flight.

(3) Emergencies

- (a) Single engine hover, takeoff and in-flight failures.
- (b) Engine emergency restart in-flight.
- (c) In-flight engine fire.
- (d) ICDS failure.
- (e) OEI landing.
- (f) OEI waveoff.

FAM-120

1.5

A(MV-22) N

IP

Goal. Introduce night unaided FAM maneuvers.

Requirement

(1) Discuss

- (a) Crew day/Crew rest.
- (b) Civilian airfield traffic pattern and entry procedures.
- (c) Civilian airfield lighting.
- (d) Radar altimeter low setting.
- (e) Use of hover display.
- (f) Use of flight director/coupled modes.
- (g) Aircrew coordination.

(2) Review

- (a) Low work.
- (b) Transition to forward flight (from the hover).
- (c) Normal landing pattern.
- (d) Normal approach.
- (e) STO (60, 70, and 75 degrees nacelle as directed).
- (f) Running landing.
- (g) Steep approach.
- (h) No hover landing.
- (i) Transition to airplane mode from takeoff (Attention to descending tendencies).
- (j) Landing pattern entry in airplane mode.
- (k) Use of flight director/coupled modes.
- (l) Use of hover display.
- (m) AFCS off flight.

(3) Emergencies

- (a) Single engine hover, takeoff and in-flight failures.
- (b) Single engine landing.
- (c) Single engine waveoff.

(d) In-flight engine fire.

Prerequisite. SFAM-117.

FAM-121 2.0 R,M S(FFS) NS SIMI or NSFI

Goal. Introduce HLL NVD FAM maneuvers.

Requirement

(1) Discuss

(a) Moon illumination data/nautical twilight (CNT, EENT, BMNT).

(b) Weather brief/effects.

(c) NVG preflight and adjustments.

(d) NVG HUD symbology/control panel/declutter levels/failure.

(e) NVG failures.

(f) Goggle/De-goggle procedures.

(g) Cockpit lighting.

(h) NVG field of view/scanning techniques.

(i) Fixation tendencies.

(j) Loss of visual acuity and depth perception.

(k) Visual illusions.

(l) Terrain Shadowing.

(m) Ground collision/ground avoidance radar.

(n) Radar altimeter low setting.

(o) Emergency procedures during NVG use.

(p) Aircrew coordination.

(2) Introduce

(a) Use of NVDs at an unlit outlying field under HLL conditions.

(b) Ground taxi.

(c) Low work.

(d) Transition to forward flight (from the hover).

(e) Normal landing pattern.

- (f) Normal approach hover.
- (g) STO (60, 70, and 75 degrees nacelle as directed).
- (h) Running landing.
- (i) Steep approach.
- (j) No hover landing.
- (k) Transition to airplane mode from takeoff (Attention to descending tendencies).
- (l) Landing pattern entry in airplane mode.
- (m) Use of flight director/coupled modes.
- (n) AFCS off flight.
- (o) Ground collision/ground avoidance radar.
- (p) W/C/A's (those associated with the emergencies of this flight).

Prerequisite. FAM-118. NITE Lab.

FAM-122 1.5 R,M A(MV-22) N NS NSF I

Goal. Introduce HLL NVD FAM maneuvers.

Requirement

(1) Discuss

- (a) NVD briefing guide.
- (b) Review discussion items from (SFAM-121).
- (c) Aircrew coordination.

(2) Review

- (a) Use of NVDs at an unlit outlying field under ambient light levels greater than .0022 LUX as depicted by the computer generated Light Level Calendar.
- (b) Ground taxi.
- (c) Low work.
- (d) Transition to forward flight (from the hover).
- (e) Normal landing pattern.
- (f) Normal approach to a hover.
- (g) STO (60, 70, and 75 degrees nacelle as directed).

- (h) Running landing.
- (i) Steep approach.
- (j) No hover landing.
- (k) Transition to airplane mode from takeoff (Attention to descending tendencies).
- (l) Landing pattern entry in airplane mode.
- (m) Use of flight director/coupled modes.
- (n) AFCS off flight.
- (o) Ground collision/ground avoidance radar.
- (p) W/C/A's (those associated with the emergencies of this flight).

Prerequisite. SFAM 121.

3. Instruments (INST)

a. Purpose. To develop proficiency in instrument flight using all installed navigational aids.

b. General

(1) Instrument flights should be conducted under both day and night conditions. All instrument flights, whether day or night, should be conducted under instrument conditions for the PUI, using an instrument hood when necessary. One flight will be conducted at night. Refresher pilots will complete their annual instrument check in conjunction with INST-135; therefore, they will require their semi-annual minimums and instrument ground school prior to INST-135. Basic pilots whose instrument check will expire within three months of leaving the FRS will also meet the above requirements. Computer aided flight planning will be used to the greatest extent possible.

(2) PUI will be FAM-118 complete prior to starting this stage.

c. Crew Requirement. For SINST-130,131,132,133,& 134, the IP (or SIMI) is not required to be located in one of the pilot seats. Two RACs or PUIs may occupy the pilot seats.

d. Ground Training. Instrument Ground School for Annual Instrument Check.

e. Simulator Training. (5 Events, 10.0 Hours).

f. Flight Training. (2 Flights, 4.0 Hours).

SINST-130	<u>2.0</u>	S (FTD)	(N)	<u>SIMI or IP</u>
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Goal. Introduce basic instrument flight.

Requirement

(1) Discuss

(a) MFD's for IFR flight.

(b) Instrument checklist.

(c) Spatial disorientation/Vertigo.

(d) Instrument scanning techniques.

(e) Fixation tendencies.

(f) ITO.

(g) Vertical S-1 pattern.

(h) Turn pattern.

(i) Oscar pattern.

(j) Timed turns/compass turns.

- (k) Unusual attitudes/recovery procedures.
- (l) Emergency descent in IMC conditions.
- (m) "Black cockpit"/standby flight displays.
- (n) COMM 1 remote control.
- (o) Aircrew coordination.

(2) Introduce

- (a) ITO.
- (b) Basic instrument exercises using raw data only in both modes of flight.
 - 1 Vertical S-1.
 - 2 Turn pattern.
 - 3 Oscar pattern.
 - 4 Timed turns/compass turns.
- (c) Basic instrument maneuvers applying full use of the flight director/coupled mode.
- (d) Unusual attitudes/recovery.
- (e) Emergency descent.
- (f) "Black cockpit" operations.

(3) Emergencies

- (a) Single engine failure.
- (b) Dual engine failure.
- (c) Electrical failures.

Prerequisite. VMMT-204 IMI program task_____.

SINST-131

2.0

S(FTD) (N)

SIMI or IP

Goal. Introduce Non-Precision approaches and airway navigation procedures.

Requirement

(1) Discuss

- (a) ENAV functions.
- (b) IFR FLIPs and procedures.
- (c) Controlled airspace/Airway navigation procedures.

- (d) Position reporting procedures.
 - (e) Non-precision approaches.
 - (f) Holding.
 - (g) Weather minimums.
 - (h) Approach and landing minimums.
 - (i) Minimum fuel requirements for IFR flights.
 - (j) Alternate airfield requirements.
 - (k) Flight plan filing criteria.
 - (l) Flight plan close-out procedures.
 - (m) Aircrew coordination.
- (2) Introduce
- (a) Flight plan activation to IMC release.
 - (b) Departure/climb out.
 - (c) CMS ENAV functions.
 - (d) Airways navigation.
 - 1 Radial to radial intercepts (TBD).
 - 2 TACAN/VOR tracking.
 - 3 Point-to-point navigation.
 - 4 TACAN/VOR holding.
 - 5 Wind corrections.
 - 6 Time/Distance determination.
 - (e) Non-precision approaches.
 - 1 TACAN.
 - 2 VOR.
 - 3 LOC/LOC back course.
 - 4 UHF/ADF.
 - 5 ASR.
 - (f) Missed approach.
 - (g) Flight plan close out.

(3) Review

- (a) ITO.
- (b) Unusual attitudes.
- (c) Emergency descent.
- (d) "Black cockpit" operations.

(4) Emergencies

- (a) RPM LOW warning.
- (b) RPM HIGH (Nr 105% and above).
- (c) Flight control cautions.

Prerequisite. VMMT-204 IMI program task_____.

SINST-132

2.0

S (FTD) (N)

SIMI or IP

Goal. Introduce Precision approaches, High altitude FLIP charts and penetration procedures.

Requirement(1) Discuss

- (a) High altitude FLIPs and procedures.
- (b) Penetration checklist.
- (c) Precision approaches.
- (d) Precision approach minimums.
- (e) Use of ATIS and AWOS.
- (f) Pilot to metro services.
- (g) PIREPS.
- (h) Aircrew coordination.

(2) Introduce

- (a) Class A airspace procedures.
- (b) Penetration checklist.
- (c) Penetration/High altitude approach.
- (d) GPS approach.
- (e) ILS approach.
- (f) PAR approach

(3) Review

- (a) Flight plan activation to IMC release.
- (b) Departure/climb out.
- (c) CMS ENAV functions.
- (d) Airways navigation.
- (e) Holding.
- (f) Missed approach
- (g) Flight plan close out.

(4) Emergencies

- (a) Electrical failures.
- (b) Fuel cautions.
- (c) O2N2 system fail.

Prerequisite. VMMT-204 IMI program task_____.

SINST-133

2.0

R S/A(FFS/MV-22) (N)

SIMI or IP

Goal. Review IFR, Non-precision and precision approach procedures.

Requirement(1) Discuss

- (a) Aircraft instrument equipment requirements.
- (b) Actual instrument conditions.
- (c) SIGMETS and AIRMETS.
- (d) Declaring emergencies (MAYDAY, PAN PAN).
- (e) Instrument approach lighting.
- (f) Aircrew coordination.

(2) Review

- (a) TACAN approach.
- (b) VOR approach.
- (c) LOC/LOC back course approaches.
- (d) UHF/ADF approach.
- (e) ASR approach.

- (f) PAR approach.
- (g) GPS approach.
- (h) ILS approach.
- (3) Emergencies
 - (a) In-flight fire.
 - (b) Avionics cautions.

Prerequisite. VMPT-204 IMI program task_____.

SINST-134

2.0

R,M S/A (FFS/MV-22) (N)

SIMI or IP

Goal. Evaluate previously introduced basic instruments, IFR, approach and airway navigation procedures.

Requirement

- (1) Discuss
 - (a) Icing (structural, rime, clear).
 - (b) Lost comm procedures.
 - (c) IFF during emergencies/lost comm.
 - (d) Aldis lamp signals.
 - (e) Aircraft de-ice and anti-ice systems.
 - 1 Associated W/C/A's.
 - 2 Icing displays/CMS information.
 - (f) Aircrew coordination.
- (2) Evaluate
 - (a) Flight plan filing and IMC release.
 - (b) Departure procedures.
 - (c) Airways navigation.
 - (d) Holding.
 - (e) Non-precision approach.
 - (f) Precision approach.
 - (g) Missed approach.
 - (h) Turn pattern (airplane mode).
 - (i) Unusual attitudes (airplane/conversion mode).

(j) Oscar pattern (conversion mode).

(k) Emergency descent in IMC.

(3) Emergencies

(a) Ice PROT fail.

(b) Icing and thunderstorms.

(c) Lost communications.

Prerequisite. VMMT-204 IMI program task_____.

NST-135

2.0

R A/S(MV-22/FFS) (N)

IP

Goal. Evaluate previously introduced basic instruments, IFR, approach and airway navigation procedures. Intent of training flight is to conduct first half under a preplanned/filed IFR flight plan and second half VFR plan with basic instrument work ending with in-flight filing (IFR) to return to base.

Requirement

(1) Discuss

(a) SIDs.

(b) STARs.

(c) Visual approach.

(d) Contact approach.

(e) Aircraft category.

(f) Airspace classifications.

(g) Terminal RADAR services.

(h) In-flight filing (VFR/IFR).

(i) Aircrew coordination.

(2) Introduce. In-flight filing.

(3) Evaluate

(a) Flight plan filing and IMC release.

(b) Departure procedures.

(c) Airways navigation.

(d) Holding.

(e) Non-precision approach.

- (f) Precision approach.
- (g) Missed approach.
- (h) Turn pattern (airplane mode).
- (i) Unusual attitudes (airplane/conversion mode).
- (j) Oscar pattern (conversion mode).
- (k) Emergency descent in IMC.
- (4) Emergencies
 - (a) Single engine failure.
 - (b) Simulated "Black Cockpit" (PUI will mask both MFD's).

Prerequisite. Simulator instrument stage complete/VMMT-204 IMI program task_____.

INST-136

2.0

R,M A/S(MV-22) (N)

IP

Goal. Conduct Instrument evaluation.

Requirement. IP will develop flight scenario. PUI will brief, plan, execute and debrief based on IP guidance.

Prerequisite. Instrument flight minimums per OPNAV 3710.

4. Confined Area Landings (CAL)

- a. Purpose. To develop proficiency in performing takeoffs and landings in confined areas.
- b. General. PUI must demonstrate the capability to safely takeoff and land in a confined area during day/night.
- c. Crew Requirement. IP/PUI/CC.
- d. Ground Training. Confined Area Landing stage lecture and/or Interactive Course Ware, CDU Trainer.
- e. Simulator Training. (2 Events, 4.0 Hours).
- f. Flight Training. (2 Flights, 3.0 Hours).

SCAL-140 2.0 S (FFS) SIMI or IP

Goal. Demonstrate/Introduce Confined Area Landings (CAL) at various sites.

Requirement

(1) Discuss

- (a) Phases of CALs (Enroute, Site evaluation, Approach, Hovering, Landing, Takeoff).
- (b) CAL types (Confined area, Pinnacle, Ridge line).
- (c) Site evaluations.
- (d) CAL environment (Size, Shape, Slope, Winds, Obstacles, Ingress Egress route, Suitability, Topography).
- (e) External factors (Wind, Visual illusions, Temperature, Time of day, Altitude).
- (f) Power requirements/Performance charts (HIGE, HOGE, height velocity diagram) with MPS considerations.
- (g) Radar Altimeter settings.
- (h) Interim power.
- (i) Pitch-up side slip characteristics.
- (j) FLIR operation (Function, Theory, Relationships, Operation, Degraded).
- (k) INAV functions (WYPT steer).
- (l) Digital map.
- (m) EAPS operations.
- (n) Standard terminology.

- (o) Aircrew coordination.
- (2) Demonstrate/Introduce
 - (a) INAV functions (WYPT steer).
 - (b) FM Homing.
 - (c) FLIR operations.
 - 1 Preflight.
 - 2 FLIR alignment.
 - 3 In-flight use/modes of operation.
 - 4 Update/store.
 - 5 Post flight operations.
 - (d) CAL site evaluation.
 - (e) Landing pattern.
 - (f) Approach.
 - 1 Normal.
 - 2 Steep.
 - 3 Offset (90, 180, 270 degrees).
 - 4 Low level.
 - 5 Spiral.
 - (g) Vertical and no hover landings.
 - (h) Takeoff.
 - 1 Obstacle.
 - 2 Max performance.
 - 3 Max gross weight (marginal power).
 - 4 Zoom.
 - 5 Spiral.
 - (i) Brown out/White out procedures.
 - (j) Wave off.
 - (k) W/C/A's (those associated with the emergencies of this flight).

(3) Emergencies

- (a) Single engine failure in a hover.
- (b) Single engine failure on takeoff.
- (c) Single engine failure in-flight.
- (d) Single engine landing.
- (e) Single engine wave off.
- (f) Settling with power.

Prerequisite. FAM stage complete/VMMT-204 IMI program task_____.

CAL-141

1.5

R A(MV-22)

IP

Goal. Introduce confined area landings (CALs) at various sites.

Requirement

(1) Discuss

- (a) Zone brief.
- (b) Aircraft clearance.
- (c) Power requirements/Performance charts (HIGE, HOGE, height velocity diagram) with MPS considerations.
- (d) Radar Altimeter settings.
- (e) Interim power.
- (f) Pitch-up side slip characteristics.
- (g) FLIR operation.
- (h) INAV functions (WYPT steer).
- (i) Aircrew coordination.

(2) Introduce

- (a) INAV functions (WYPT steer).
- (b) FLIR operations.
- (c) CAL site evaluation.
- (d) Landing pattern.
- (e) Approach (Approaches from SCAL-140).
- (f) Vertical and no hover landings.

- (g) Takeoff (Methods from SCAL-140).
- (h) Brown out/White out procedures.
- (i) Wave off.
- (j) W/C/A's (those associated with the emergencies of this flight).

(3) Emergencies

- (a) Single engine failure (hover).
- (b) Single engine failure on takeoff.
- (c) Single engine failure in-flight.
- (d) Single engine landing.
- (e) Single engine wave off.

Prerequisite. SCAL-140/VMMT-204 IMI program task_____.

SCAL-142 2.0 R S (FFS) NS SIMI or NSFI

Goal. Demonstrate/Introduce night confined area landings (HLL) at various CAL sites utilizing NVDs.

Requirement

(1) Discuss

- (a) NVD briefing guide.
- (b) Cockpit/Aircraft configuration and lighting.
- (c) CAL lighting patterns.
- (d) Cockpit displays.
- (e) NVG HUD operations.
- (f) INAV functions and digital map.
- (g) FLIR operations.
- (h) Use of flight director and coupled modes.
- (i) Scanning techniques.
- (j) Standard terminology.
- (k) Loss of visual contact with the ground/reference points.
- (l) Wave off.
- (m) Aircrew coordination.

(n) Power requirements/Performance charts (HIGE, HOGE, height velocity diagram) with MPS considerations.

(2) Demonstrate/Introduce

(a) Use of NVGs at an unlit CAL site under ambient light levels greater than .0022 LUX as depicted by the computer generated Light Level Calendar.

(b) FLIR operations/use at night.

(c) Power computations.

(d) CAL site evaluation.

(e) Approach.

1 Normal.

2 Steep.

3 Low Level.

4 Offset (90, 180, 270 degrees).

(f) Vertical and no hover landings.

(g) Takeoff.

1 Max performance (zoom climb).

2 Max gross weight (marginal power).

3 Obstacle.

(h) Brown out/white out procedures.

(i) Wave off.

(j) W/C/A's (those associated with the emergencies of this flight).

(3) Emergencies. Single engine considerations at night.

CAL-143

1.5

R,M A(MV-22) N NS

NSFI

Goal. Introduce night confined area landings at various CAL sites utilizing NVDs.

Requirement

(1) Discuss

(a) NVD briefing guide.

(b) Review discussion items from SCAL-142.

(c) Aircrew coordination.

(2) Demonstrate/Introduce

- (a) Use of NVGs at an unlit CAL site under ambient light levels greater than .0022 LUX as depicted by the computer generated Light Level Calendar.
- (b) FLIR operations/use at night.
- (c) Power computations.
- (d) High reconnaissance.
- (e) CAL site evaluation.
- (f) Low reconnaissance.
- (g) Approach (Approaches from SCAL-142).
- (h) Vertical and no hover landings.
- (i) Takeoff (Methods from SCAL-142).
- (j) Wave off.
- (k) W/C/A's (those associated with the emergencies of this flight).

Prerequisite. SCAL-142. VMMT-204 IMI program task____.

5. Navigation (NAV)

a. Purpose. To develop the ability to conduct navigational flight.

b. General

(1) The PUI will conduct a thorough map study using information provided by the IP along with computer aided flight planning and available electronic navigation systems. The FRS will develop appropriate low level routes for simulator events and supply them to the Simulator Instructor.

(2) PUI will be FAM-118 complete prior to starting this stage and FAM stage complete prior to SNAV-152.

c. Ground Training. NAV stage lecture and/or Interactive Course Ware, CDU Trainer, Computer based flight planning.

d. Crew Requirement. IP/PUI/CC.

e. Simulator Training. (2 Events, 4.0 Hours).

f. Flight Training. (2 Flights, 3.0 Hours).

SNAV-150

2.0

S (FFS)

SIMI or IP

Goal. Introduce low level navigation (no lower than 200 feet AGL) using time, distance and heading to an objective, then navigate using aircraft's navigational equipment to return to base.

Requirement

(1) Discuss

(a) Low Level NAV techniques.

(b) WYPT/IP Selection.

(c) Map preparation/Map study.

(d) MPS/MDL cartridge.

(e) GPS initialization.

1 Almanac data, cold start, warm start.

2 Accuracy (SPS, PPS, SA and A-S).

(f) LWINS (Kalman Filter, NAV initialization and alignment procedures).

(g) INS update methods, overfly store functions (when required).

(h) MSN Data Load, WYPT, FPLN, INAV, MSN key functionality.

(i) Flight Director/Flight Director Panel operations.

(j) Digital Map functions (Charts, DTED, CIB, HAT, CLOS and Threat Intervisibility).

(k) Integration of FLIR during navigation.

(l) Aircrew Coordination.

(2) Introduce. PUI will prepare a NAV route (paper product) 40 to 45 minutes in duration with a minimum of 6 intermediate check points to an objective (landing optional) flying the first 3 check points in conversion mode and last three in airplane mode. The ingress will exercise basic navigational skills without the use of the CMS. Egress using an equivalent route (MPS derived) with the use of all CMS functions. Intent is to exercise both conversion and airplane modes of flight during the ingress and egress.

(a) AV initialization and alignment procedures during start-up.

(b) Time/Distance checks, TOT and fuel management.

(c) Use of various maps/charts (e.g. 1:1,000,000, 1:500,000, 1:250,000, 1:50,000 etc.).

(d) MSN Data Load, WYPT, FPLN, INAV, MSN key functionality.

(e) FPLN activation/manipulation, NAV display (HSD) and Flight Director set-up operations.

(f) INS update methods, overfly store functions.

(g) Digital Map functions.

(h) Integration of FLIR during navigation.

Prerequisite. FAM-118 complete. VMMT-204 IMI program task _____. If a CAL landing is planned at the objective, then SCAL-140 is a prerequisite.

NAV-151

1.5

R A(MV-22)

IP

Goal. Introduce low level navigation (no lower than 200 feet AGL) using time, distance and heading to an objective, then navigate using aircraft's navigational equipment to return to base.

Requirement

(1) Discuss

(a) Low Level NAV techniques.

(b) WYPT/IP Selection.

(c) Map preparation/Map study.

(d) MPS/MDL cartridge.

(e) GPS initialization.

1 Almanac data, cold start, warm start.

2 Accuracy (SPS, PPS, SA and A-S).

(f) LWINS (Kalman Filter, NAV initialization and alignment procedures).

(g) INS update methods, overfly store functions (when required).

(h) MSN Data Load, WYPT, FPLN, INAV, MSN key functionality.

(i) Flight Director/Flight Director Panel operations.

(j) Digital Map functions (Charts, DTED, CIB, HAT, CLOS and Threat Intervisibility).

(k) Integration of FLIR during navigation.

(l) Aircrew Coordination.

(2) Introduce. PUI will prepare a NAV route 25 to 30 minutes in duration with a minimum of 4 intermediate check points to an objective (landing optional) flying in conversion mode. The ingress route (paper product) will exercise basic navigational skills without the use of the CMS. Egress in airplane mode using an equivalent route (MPS derived) with the use of all CMS functions. Intent is to exercise both conversion and airplane modes of flight.

(a) NAV initialization and alignment procedures during start-up.

(b) Time/Distance checks, TOT and fuel management.

(c) Use of various maps/charts (e.g. 1:1,000,000, 1:500,000, 1:250,000, 1:50,000 etc.).

(d) MSN Data Load, WYPT, FPLN, INAV, MSN key functionality.

(e) FPLN activation/manipulation, NAV display (HSD) and Flight Director set-up operations procedures.

(f) INS update methods, overfly store functions.

(g) Digital Map functions.

(h) Integration of FLIR during navigation.

Prerequisite. SNAV-150. VMMT-204 IMI program task _____. If a CAL landing is planned at the objective, then CAL-141 is a prerequisite.

SNAV-1522.0M S(FFS) NSSIMI or IP

Goal. Introduce low level navigation (no lower than 200 feet AGL) using time, distance and heading to an objective, then navigate using aircraft's navigational equipment to return to base utilizing NVDs.

Requirement

(1) Discuss

- (a) NVG briefing guide.
- (b) Cockpit/Aircraft configuration and lighting
- (c) Cockpit displays.
- (d) NVG HUD operations.
- (e) WYPT/IP Selection with night considerations.
- (f) Map preparation/Map study with night considerations.
- (g) Low Level NAV techniques utilizing NVDs.
- (h) GPS/LWINS operations.
- (i) CMS Operations as it applies to navigation.
- (j) Digital Map functions.
- (k) Integration of FLIR during navigation.
- (l) Aircrew Coordination.

(2) Introduce. PUI will prepare a NAV route 40 to 45 minutes in duration with a minimum of 6 intermediate check points to an objective (landing optional) flying the first 3 check points in conversion mode and last three in airplane mode. The ingress route (paper product) will exercise basic navigational skills without the use of the CMS. Egress will use an equivalent route (MPS derived) using all CMS functions. Intent is to exercise both conversion and airplane modes of flight during the ingress and egress.

- (a) Aircraft lighting use/configuration.
- (b) Time/Distance checks, TOT and fuel management.
- (c) Use of various maps/charts (e.g. 1:1,000,000, 1:500,000, 1:250,000, 1:50,000 etc.).
- (d) CMS Operations as it applies to navigation.
- (e) Digital Map functions.
- (f) Integration of FLIR during navigation.

Prerequisite. FAM stage complete. SNAV-150. VMMT-204 IMI program task____. If a CAL landing is planned at the objective, then SCAL-142 is a prerequisite.

NAV-153

1.5

R,M A(MV-22) N NS

IP

Goal. Introduce low level navigation (no lower than 200 feet AGL) using time, distance and heading to an objective, then navigate using aircraft's navigational equipment to return to base utilizing NVDs.

Requirement

(1) Discuss

- (a) NVG briefing guide.
- (b) Cockpit/Aircraft configuration and lighting.
- (c) Cockpit displays.
- (d) NVG HUD operations.
- (e) WYPT/IP Selection with night considerations.
- (f) Map preparation/Map study with night considerations.
- (g) Low Level NAV techniques utilizing NVDs.
- (h) GPS/LWINS operations.
- (i) CMS Operations as it applies to navigation.
- (j) Digital Map functions.
- (k) Integration of FLIR during navigation.
- (l) Aircrew Coordination.

(2) Introduce. PUI will prepare a NAV route 25 to 30 minutes in duration with a minimum of 4 intermediate check points to an objective (landing optional) flying in conversion mode. The ingress route (paper product) will exercise basic navigational skills without the use of the CMS. Egress in airplane mode using an equivalent route (MPS derived) with the use of all CMS functions. Intent is to exercise both conversion and airplane modes of flight.

- (a) Aircraft lighting use/configuration.
- (b) Time/Distance checks, TOT and fuel management.
- (c) Use of various maps/charts (e.g. 1:1,000,000, 1:500,000, 1:250,000, 1:50,000 etc.).
- (d) CMS Operations as it applies to navigation.
- (e) Digital Map functions.

(f) Integration of FLIR during navigation.

Prerequisite. FAM stage complete. NAV-151. VMMT-204 IMI program task____. If a CAL landing is planned at the objective, then CAL-143 is a prerequisite.

6. Tilt-Rotor Low Altitude Tactics (VLAT)

a. Purpose. To develop proficiency in VLAT maneuvers with emphasis on the importance of crew coordination, comfort level, and common terminology.

b. General

(1) A designated VLATI is required for all initial VLAT instructional events. The prerequisite academic lectures that support the VLAT stages are contained in the MAWTS-1 Academic Support Package except MITAC which is self-contained. The academic training shall be completed prior to commencing the VLAT flight syllabus.

(2) Maneuver descriptions may be found in the MV-22 Tactics Manual, and explained in the current MAWTS-1 Academic Support Package.

(3) Currency and altitudes are established and listed in Aviation T&R Manual, Vol 1.

(4) The entire flight crew shall brief together for each flight.

c. Crew Requirement. VLATI/PUI/CC/AO.

d. Prerequisite. PUI shall be FAM-118 and NAV-151 complete prior to SVLAT-160. PUI shall be FAM and NAV stage complete prior to SVLAT-164.

e. Ground Training

(1) VLAT stage of training lecture.

(2) Familiarity with Chapter 15, MV-22 Tactics Manual.

f. Simulator Training. (3 Events, 6.0 Hours).g. Flight Training. (2 flights, 3.0 hours).

<u>SVLAT-160</u>	<u>2.0</u>	<u>S (FFS)</u>	<u>SIMI OR VLATI</u>
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Goal. Demonstrate/Introduce aircraft maneuver performance and characteristics in the VLAT environment (airplane mode).

Requirement(1) Discuss

(a) Simulation limitations.

(b) Purpose of VLAT maneuvering.

(c) T&R VOL I, MV-22 Tactics Manual information concerning VLAT rules of conduct.

- (d) VLAT altitude/airspeed restrictions (currency).
- (e) Aircraft performance charts, energy maneuverability charts, aircraft capabilities and limitations.
- (f) VLAT turns vs stall speeds.
- (g) Control laws.
- (h) Radar altimeter setting.
- (i) Use of FLIR/Digital map (By PNAC).
- (j) Ground collision/ground avoidance radar.
- (k) Crew comfort levels/climb to cope.
- (l) Pilot techniques.
- (m) Tactical movement considerations.
- (n) Weather conditions/sun position and shadowing effects.
- (o) Flight safety/emergencies/pilot's reduced reaction times at low altitudes.
- (p) Standard terminology.
- (q) Aircrew coordination.
- (2) Demonstrate/Introduce
 - (a) Low level flight/Contour profiles.
 - (b) High AOB turns.
 - (c) Terrain masking/unmasking (traveling principles).
 - (d) Bunt.
 - (e) Roll.
 - (f) Slow speed flight.
 - (g) FLIR, Digital map and INAV operations (By PNAC).

(3) Evaluate. Objectives of CAL-141.

Prerequisite. FAM-118, CAL-141, NAV-151. VMMT-204 IMI program task_____.

SVLAT-161

2.0

S (FFS)

SIMI OR VLATI

Goal. Demonstrate/Introduce aircraft maneuver performance and characteristics in the VLAT environment (conversion mode).

Requirement

(1) Discuss

- (a) T&R VOL I, MV-22 Tactics Manual information concerning VLAT rules of conduct.
- (b) Review discussion items from SVLAT-160.
- (c) Aircraft dimensions, blade walk around, aircraft lowest point vs AOB.
- (d) VLAT "stair step" to lower altitudes/proficiency.
- (e) Altitude effects with nacelle rotation.
- (f) Pitch-up side slip characteristics.
- (g) Aircrew coordination.

(2) Demonstrate/Introduce

- (a) VLAT performance checks.
- (b) Low level flight/Contour profiles.
- (c) High AOB turns.
- (d) Terrain masking/unmasking
- (e) Bunt.
- (f) Roll.
- (g) Low level quickstops.
- (h) FLIR, Digital map and INAV operations (By PNAC).

(3) Evaluate. Objectives of CAL-141.

Prerequisite. FAM-118, CAL-141, NAV-151. VMMT-204 IMI program task_____.

VLAT-162

1.5

R A(MV-22)

VLATI

Goal. Demonstrate/Introduce aircraft maneuver performance and characteristics in the VLAT environment (airplane mode).

Requirement(1) Discuss

- (a) T&R VOL I, MV-22 Tactics Manual information concerning VLAT rules of conduct.
- (b) Aircraft performance charts, energy maneuverability charts, aircraft capabilities and limitations.
- (c) VLAT turns vs stall speeds.

- (d) Control laws.
- (e) Radar altimeter setting.
- (f) Use of FLIR/Digital map (By PNAC).
- (g) Ground collision/ground avoidance radar.
- (h) Crew comfort levels/climb to cope.
- (i) Pilot techniques.
- (j) Tactical movement considerations.
- (k) Weather conditions/sun position and shadowing effects.
- (l) Flight safety/emergencies/pilot's reduced reaction times at low altitudes.
- (m) Standard terminology.
- (n) Aircrew coordination.
- (2) Demonstrate/Introduce
 - (a) VLAT performance checks.
 - (b) Low level flight/Contour profiles.
 - (c) High AOB turns.
 - (d) Terrain masking/unmasking.
 - (e) Bunt.
 - (f) Roll.
 - (g) Slow speed flight.
 - (h) FLIR, Digital map and INAV operations (By PNAC).
- (3) Evaluate. Objectives of CAL-141.

Prerequisite. FAM-118, CAL-141, NAV-151, SVALT-160.
VMMT-204 IMI program task_____.

VLAT-163

1.5

R,M A(MV-22)

VLATI

Goal. Demonstrate/Introduce aircraft maneuver performance and characteristics in the VLAT environment (conversion mode).

Requirement

- (1) Discuss
 - (a) Review discussion items from VLAT-162.

(b) Aircraft dimensions, blade walk around, aircraft lowest point vs AOB.

(c) VLAT "stair step" to lower altitudes (currency/comfort level).

(d) Pitch-up side slip characteristics.

(e) Altitude effects with nacelle rotation.

(f) Aircrew coordination.

(2) Demonstrate/Introduce

(a) Blade walk around.

(b) VLAT performance checks.

(c) Low level flight/Contour profiles.

(d) High AOB turns.

(e) Terrain masking/unmasking.

(f) Bunt.

(g) Roll.

(h) Low level quickstops.

(i) FLIR, Digital map and INAV operations (By PNAC).

(3) Evaluate. Objectives of CAL-141.

Prerequisite. VLAT-162. VMMT-204 IMI program task_____.

SVLAT-164
VLATI

2.0

R S(FFS) NS

SIMI OR

Goal Demonstrate/Introduce aircraft maneuver performance and characteristics in the VLAT environment utilizing NVDs.

Requirement

(1) Discuss

(a) NVG briefing guide.

(b) Cockpit display configurations.

(c) NVG HUD operations.

(d) T/O, Enroute, Approaches and Landing procedures.

(e) RAD ALT settings and Altitude changes.

(f) Airspeed/Hazard avoidance.

(g) Aircrew coordination

(2) Demonstrate/Introduce

- (a) VLAT performance checks.
- (b) Low level flight/Contour profiles in both airplane and conversion modes.
- (c) High AOB turns in both airplane and conversion modes.
- (d) Terrain masking/unmasking.
- (e) Bunt.
- (f) Roll.
- (g) Low level quickstops.
- (h) FLIR, Digital map and INAV operations (By PNAC).

(3) Review. Objectives of CAL-143.

Prerequisite. VLAT-163, CAL-143, NAV-153. VMMT-204 IMI program task_____.

7. Formation (FORM)

a. Purpose. To develop the ability to rendezvous and fly prescribed formation maneuvers.

b. General

(1) At the completion of this stage, the PUI will be proficient at formation takeoff, rendezvous, lead change, and formation maneuvers.

(2) PUI will be FAM-118 complete prior to starting stage.

c. Crew Requirements. IP/PUI/CC.

d. Simulator Training. (3 Events, 6.0 Hours).

e. Flight Training. (2 Flights, 4.0 Hours).

SFORM-170

2.0

S(FFS)

SIMI or IP

Goal. Introduce cruise formation during Conversion and Airplane modes.

Requirement(1) Discuss

(a) Cruise formation/radius of turn principles.

(b) Use of nacelles as an airspeed controller.

(c) Closure rates.

(d) Section takeoff.

(e) Running/carrier rendezvous.

(f) Crossovers/cross unders (per mode of flight).

(g) Turns/turn patterns.

(h) Overrun/underruns (per mode of flight).

(i) Breakup and rendezvous.

(j) Transition/conversion between modes.

1 Nr settings (14-100%).

2 Nacelle rotation coordination/timing between aircraft.

3 Nacelle rotation rates.

(k) Lead Changes.

(l) Section landings.

- (m) Wingman responsibility for flight separation.
 - (n) Loss of visual contact/rejoining of flight.
 - (o) Use of FLIR.
 - (p) Limitations of simulator.
 - (q) Aircrew Coordination within flight/aircraft.
 - (2) Demonstrate. Use of FLIR.
 - (3) Introduce
 - (a) Section takeoff.
 - (b) Running/carrier rendezvous.
 - (c) Cruise position/principles.
 - (d) Crossovers/cross unders (per mode of flight).
 - (e) Turns/turn patterns.
 - (f) Overrun/underruns (per mode of flight).
 - (g) Breakup and rendezvous.
 - (h) Transition to airplane mode/conversion from airplane mode.
 - (i) Lead changes.
 - (j) Formation landings.
 - (4) Emergencies. Discuss inter- and intra-cockpit communications/coordination during section emergencies.
- Prerequisite. SCAL-140. VMGT-204 IMI program task____.

SFORM-171

2.0

S (FFS)

SIMI or IP

Goal. Introduce parade formation flight in conversion and airplane modes.

Requirement

- (1) Discuss
 - (a) Parade position/visual reference points.
 - (b) Considerations of close formation/situational awareness.
 - (c) Previous formation discussion items pertinent to this flight.
 - (d) Aircrew Coordination within flight/aircraft.

(2) Demonstrate

- (a) Use of FLIR.
- (b) STO section takeoff.

(3) Introduce

- (a) Section takeoff.
- (b) Running/Carrier rendezvous.
- (c) Parade position.
- (d) Crossovers/cross unders (per mode of flight).
- (e) Turns/turn patterns.
- (f) Overrun/underruns (per mode of flight).
- (g) Breakup and rendezvous.
- (h) Transition to airplane mode/conversion from airplane mode.
- (i) Lead changes.
- (j) Formation landings.
- (k) Use of FLIR where appropriate.

Prerequisite. CAL-141, SFORM-170. VMPT-204 IMI program task_____.

FORM-172

2.0

R A(2 MV-22)

IP

Goal. Review parade and cruise formation in the aircraft.

Requirement

(1) Discuss

- (a) Cruise/parade position and appropriate visual reference points.
- (b) Previous formation discussion items pertinent to this flight.
- (c) Sun position in reference to lead aircraft.
- (d) Aircrew Coordination within flight/cockpit.

(2) Demonstrate

- (a) Use of FLIR.
- (b) STO section takeoff.

(3) Review

- (a) Section takeoff.
- (b) Running/carrier rendezvous.
- (c) Cruise/parade position.
- (d) Crossovers/Cross unders (per mode of flight).
- (e) Turns/turn patterns.
- (f) Overrun/underruns (per mode of flight).
- (g) Breakup and rendezvous.
- (h) Transition to airplane mode/conversion.
- (i) Lead changes.
- (j) Formation landings.

(4) Emergencies. Review previous FORM EPs.

Prerequisite. SCAL-142, SFORM-170, SFORM-171. VMMT-204 IMI program task_____.

SFORM-173

2.0

R,M S(FFS) NS

SIMI or NSFI

Goal. Introduce night formation utilizing NVDs (HLL).

Requirement(1) Discuss

- (a) NVG briefing guide.
- (b) Aircraft lighting and use.
- (c) Position/visual reference points at night.
- (d) Night scan/fixation tendencies.
- (e) Depth perception/relative motion at night.
- (f) Night formation hazards.
- (g) Use of NVG HUD.
- (h) Previous formation discussion items pertinent to this flight.
- (i) Aircrew coordination.

(2) Demonstrate. Use of FLIR.

(3) Introduce

- (a) Section takeoff.
- (b) Running/carrier rendezvous.
- (c) Formation position.
- (d) Crossovers/cross unders (per mode of flight).
- (e) Turns/turn patterns.
- (f) Overrun/underruns (per mode of flight).
- (g) Breakup and rendezvous.
- (h) Transition to airplane mode/conversion from airplane mode.
- (i) Lead changes.
- (j) Formation landings.

Prerequisite. SFAM-121, SCAL-142, and SFORM-171. VMMT-204 IMI program task_____.

FORM-174

2.0

A(2 MV-22) N NS

NSFI

Goal. Review night formation utilizing NVDs (HLL).

Requirement(1) Discuss

- (a) NVG briefing guide.
- (b) Aircraft lighting and use.
- (c) Position/visual reference points at night.
- (d) Night scan/fixation tendencies.
- (e) Depth perception/relative motion at night.
- (f) Night formation hazards.
- (g) Use of NVG HUD.
- (h) Moon position in reference to lead aircraft.
- (i) Previous formation discussion items pertinent to this flight.
- (j) Aircrew coordination.

(2) Demonstrate. Use of FLIR.(3) Review

- (a) Section takeoff.
- (b) Running/carrier rendezvous.
- (c) Formation position.
- (d) Crossovers/cross unders (per mode of flight).
- (e) Turns/turn patterns.
- (f) Overrun/underruns (per mode of flight).
- (g) Breakup and rendezvous.
- (h) Transition to airplane mode/conversion.
- (i) Lead changes.
- (j) Formation landings.

Prerequisite. FAM-122, CAL-143, FORM-172, and SFORM-173.
VMMT-204 IMI program task_____.

8. External Loads (EXT)

- a. Purpose. Develop skills necessary for external cargo operations.
- b. General. Prior to SEXT-180, refer to operational and safety considerations discussed in the appropriate NATOPS Flight Manual and FMFRP 5-31, Multi-Service Helicopter External Air Transport Manual. Discuss and become thoroughly familiar with all aspects of aircrew coordination applicable to external operations as described in the appropriate NATOPS Flight Manual.
- c. Crew Requirements. IP/PUI/CC/AO.
- d. Ground Training. External Operations stage training lecture or Interactive Course Ware.
- e. External Syllabus Support. Helicopter Support Team (HST).
- f. Simulator Training. (2 Events, 4.0 Hours).
- g. Flight Training. (3 Flights, 5.0 Hours).

<u>SEXT-180</u>	<u>2.0</u>	<u>M S(FFS)</u>	<u>SIMI or IP</u>
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Goal. To demonstrate/introduce single point and dual point external cargo operations. Perform a minimum of three hookup and releases during both single and dual point operations.

Requirement(1) Discuss

- (a) Performance charts and MPS considerations.
- (b) Power available versus power required limitations.
- (c) Aircraft hook release systems. Hook preflight and checks.
- (d) Power checks, switchology and Helicopter Support Team (HST) brief.
- (e) HST composition, functions and signals.
- (f) Approach to LZ. Downwash, static electricity, FOD and precision hover.
- (g) Cargo hookup procedures, heading control and hover checks.
- (h) Aircrew/ground crew communications/coordination during external cargo operations.
- (i) Transition to forward flight.
- (j) Pattern work, negative G's, load swing and CMS monitoring during flight.
- (k) Approach with load and cargo release procedures.

- (l) Wave off with external load.
- (m) Hoist operations.
- (n) Simulator limitations.
- (o) FMFRP 5-31, Volume 1, Multi-Service Helicopter External Air Transport Manual.
- (2) Demonstrate/Introduce
 - (a) Power Checks.
 - (b) Approach to pickup zone.
 - (c) Single point cargo hookup.
 - (d) Dual point cargo hookup.
 - (e) En route procedures with external loads.
 - (f) Approach and cargo release procedures.
 - (g) Wave off with external load.
 - (h) Departure from pickup zone.
 - (i) Simulated hoist operations.
 - (j) Use of FLIR (Demonstrate only).
- (3) Emergencies
 - (a) Discuss in-flight cargo jettison criteria and procedures.
 - (b) Inadvertent IMC with external loads.
 - (c) Emergency procedures with external loads.
 - (d) Loss of ICS.

Prerequisite. SCAL-140. VMMT-204 IMI program task_____.

SEXT-181

2.0

M S(FFS) NS

SIMI or NSFI

Goal. Introduce single point external cargo operations at night utilizing NVDs. Perform a minimum of 5 hookups and releases.

Requirement

- (1) Discuss
 - (a) Review all discussion items from SEXT-180.
 - (b) Review performance charts and MPS considerations.

- (c) NVG briefing guide.
- (d) Aircraft and landing zone lighting.
- (2) Demonstrate/Introduce
 - (a) Approach to pickup zone on NVDs.
 - (b) Single point cargo hookup.
 - (c) En route procedures with external loads.
 - (d) Approach and cargo release procedures.
 - (e) Wave off with external load.
 - (f) Departure from pickup zone.
 - (g) Simulated hoist operations.
 - (h) Use of FLIR (Demonstrate only).
- (3) Review. Power checks.
- (4) Emergencies
 - (a) Discuss EPs from SEXT-180.
 - (b) EPs when utilizing NVDs.

Prerequisite. SEXT-180, SCAL-142. VMMT-204 IMI program task_____.

EXT-182

1.5

R A(MV-22)

IP

Goal. Introduce single point external loads in the aircraft. Perform a minimum of five hookup and releases.

Requirement

- (1) Discuss. Review all discussion items from SEXT-180.
- (2) Introduce
 - (a) Approach to pickup zone.
 - (b) Single point cargo hookup.
 - (c) En route procedures with external loads.
 - (d) Approach and cargo release procedures.
 - (e) Wave off with external load.
 - (f) Departure from pickup zone.
- (3) Review. Performance charts and MPS considerations.

- (4) Emergencies. Review EPs from SEXT-180.

Prerequisite. SEXT-180. A thorough brief shall be conducted between aircrew and ground crew personnel prior to commencing external cargo operations. In lieu of a brief, a letter of agreement may be utilized between the FRS and supporting unit.

EXT-183

2.0

R A(MV-22)

IP

Goal. Introduce dual point external cargo operations. Perform a minimum of five hookup and releases.

Requirement

- (1) Discuss

(a) Review all discussion items from SEXT-180.

- (2) Introduce

(a) Approach to pickup zone.

(b) Dual point cargo hookup.

(c) En route procedures with external loads.

(d) Approach and cargo release procedures.

(e) Wave off with external load.

(f) Departure from pickup zone.

- (3) Review. Performance charts and MPS considerations.

- (4) Emergencies. Review EP's from SEXT-180.

Prerequisite. SEXT-180, EXT-182. A thorough brief shall be conducted between aircrew and ground crew personnel prior to commencing external cargo operations. In lieu of a brief, a letter of agreement may be utilized between the FRS and supporting unit.

EXT-184

1.5

A(MV-22) N NS

NSFI

Goal. Introduce single point external operations at night utilizing NVDs. Perform a minimum of five hookup and releases.

Requirement

- (1) Discuss. Review discussion items from SEXT-181.

- (2) Introduce. Perform same mission profile as SEXT-181.

- (3) Review. Performance charts and MPs considerations.

- (4) Emergencies. Review same EP's from SEXT-181.

Prerequisite. FAM-122, SEXT-181, EXT-182. A thorough brief shall be conducted between aircrew and ground crew personnel prior to commencing external cargo operations. In lieu of a brief, a letter of agreement may be utilized between the FRS and supporting unit.

9. Combat Capable Check (REV & CCX)

a. Purpose. To review all areas of instruction and demonstrate proficiency and knowledge of all maneuvers to certify the PUI as a combat capable Tilt-rotor Second Pilot (T2P).

b. General. The PUI will demonstrate proficiency through the Combat Capable Phase. Upon completion of CCX-193, the PUI will be designated a Tilt-rotor Second Pilot. CCX-193 meets the qualifications for the 7532 MOS and will serve as the initial NATOPS evaluation (RQD-600).

c. Crew Requirement. IP/PUI/CC.

d. Prerequisites. All previous training stages complete.

e. Simulator Training. (2 Events, 3.0 Hour).

f. Flight Training. (2 Flights, 3.5 Hours).

SREV-190 1.0 R, M S (FTD) SIMI or IP

Goal. Review emergency procedures.

Requirement. The PUI will be prepared to describe and conduct any previously introduced emergency.

Prerequisite. VMMT-204 IMI program complete.

SREV-191 2.0 S (FFS) NS SIMI or NSFI

Goal. Review previous flight maneuvers, day and night.

Requirement

(1) Review/Evaluate. The PUI will be prepared to describe and conduct maneuvers from the following stages of training.

- (a) Familiarization.
- (b) Instruments.
- (c) Confined Area Landings.
- (d) Formation.
- (e) External Operations.

Prerequisite. SREV-190.

REV-192 1.5 R A (MV-22) IP

Goal. Review combat capable maneuvers.

Requirement

(1) Brief/Discuss all previously introduced flight maneuvers, emergency procedures, aircraft limitations, and aircraft systems.

(2) The PUI must be able to safely demonstrate flight proficiency and knowledge of all maneuvers and procedures covered in the combat capable stage. The IP will set the itinerary for the conduct of the event.

Prerequisite. SREV-191.

CCX-193

2.0

R,M A(MV-22)

NATOPS Evaluator

Goal. Certify the PUI as Tilt-rotor Second Pilot.

Requirement

(1) Brief/Discuss all previously introduced flight maneuvers, emergency procedures, aircraft limitations, and aircraft systems.

(2) The PUI must be prepared to safely demonstrate flight proficiency and knowledge of all maneuvers and procedures covered in the combat capable phase of training. The IP may or may not require the PUI to perform maneuvers from each area of the Combat Capable syllabus. The IP will set the itinerary for the conduct of the event.

Prerequisite. Open and Closed Book NATOPS Exams complete. REV-192.

142. COMBAT READY PHASE1. General

- a. This phase of instruction introduces the T2P to core skills.
- b. Rules of conduct will be per T&R Manual, Vol 1.
- c. Pilots shall fly Night Systems Flights in this level under ambient light conditions of .0022 LUX or greater.
- d. The PUI is considered NSQ HLL at the completion of the following events: CAL-214, FORM-224, VLAT-235, AG-264 and TAC-273.
- e. Prior to beginning a stage of training the PUI will complete the appropriate academic requirements (to include MPS) associated with that stage of training.

2. Familiarization (FAM)

- a. Purpose. To review aircraft flight characteristics, limitations, emergency procedures, and day/night familiarization maneuvers.

b. General

(1) Flights will terminate with an instrument approach when practicable.

(2) Ensure that all tactical and non-tactical applications of the MPS are discussed in detail for each event.

- c. Crew Requirements. P/P/CC. AO as required for Night Systems events.

- d. Prerequisite. CCX-193.

- e. Simulator Training. (2 Events, 3.0 Hours).

- f. Flight Training. (1 Flight, 1.5 Hours).

SFAM-200

2.0

S(FTD) N

Goal. Review night unaided familiarization maneuvers and procedures.

Requirement(1) Discuss

- (a) Familiarization maneuvers.
- (b) Aircraft lighting and use.
- (c) Night scan.
- (d) Night fixation.

- (e) Aircrew coordination.
- (f) Basic Instrument procedures.
- (2) Review
 - (a) Familiarization maneuvers.
 - (b) Operations at lighted and unlighted fields.
 - (c) Emergency procedures with emphasis on emergencies that cannot be flown in the aircraft; i.e., dual engine failure, compressor stalls, ICDS, etc.

FAM-2011.5 A(MV-22) N

Goal. Review night unaided familiarization maneuvers.

Requirement

- (1) Discuss
 - (a) Familiarization maneuvers.
 - (b) Local course rules.
 - (c) Aircrew coordination.
- (2) Review
 - (a) Familiarization maneuvers.
 - (b) Emergency procedures.

SFAM-2021.0 S(FTD)

Goal. Review emergency procedures. This event fulfills the monthly requirement for emergency procedures training per Aviation T&R Manual Volume 1.

Requirement

- (1) Review emergency procedures.
- (2) The emphasis of particular EPs will be generated by the squadron and relayed to IP or Simulator Instructor.

3. Confined Area Landings (CAL)

a. Purpose. To develop proficiency in takeoffs and landings in a confined area.

b. General

(1) Night CALs shall be performed at least 30 minutes after official sunset.

(2) Tactical and non-tactical applications of the MPS will be discussed in detail for each event.

(3) Pilots will find maneuver descriptions in the NATOPS Flight Manual and MV-22 Tactics Manual.

c. Crew Requirement. P/P/CC. AO as required for CAL-214.

d. Simulator Training. (2 Events, 4.0 Hours).

e. Flight Training. (3 Flights, 6.0 Hours).

SCAL-210

2.0

S (FTD)

Goal. Review single aircraft confined area landings and introduce tactical approaches and departures.

Requirement

(1) Discuss. Low/High threat tactical approaches, landings and departures to a confined area. Mountainous area operation considerations.

(2) Introduce

(a) Effects of wind.

(b) Landing on pinnacles.

(c) Landing on slopes.

(d) Landing in valleys and canyons.

(e) Crosswind, upslope, and downslope landings with respect to tail clearance. Use of various nacelle positions depending on the terrain.

(f) Low/High threat tactical approaches, landings and departures to a confined area.

(g) Mountainous area operations.

(3) Review. CAL-151.

CAL-211

2.0

A (MV-22)

Goal. Review tactical approaches, landings and departures to a confined area.

Requirement

(1) Discuss. Tactical approaches, landings and departures to a confined area in low/high threat environments.

(2) Introduce. Tactical approaches, landings and departures to a confined area in low/high threat environments.

Prerequisite. SCAL-210.

CAL-212

2.0

R A(MV-22)

Goal. Introduce CALs in mountainous terrain.

Requirement

(1) Discuss

(a) Aircrew coordination in mountainous terrain flight.

(b) High altitude physiology emergencies.

(c) Wind and weather effects.

(d) High altitude operations. Power available vs power required.

(e) Slope landings.

(f) Pinnacle landings.

(2) Introduce

(a) Mountainous area operations.

(b) Pinnacle landings.

(c) Slope landings.

(d) Landings and operations in valleys and canyons.

(e) Crosswind landings.

(3) Review. SCAL-210.

Prerequisite. SCAL-210 and CAL-211.

SCAL-213

2.0

R S(FTD) NSNSI

Goal. Review single aircraft CALs using NVGs in HLL.

Requirement

(1) Discuss

- (a) Aircrew coordination during NVG CAL operations.
- (b) Crew comfort level during NVG CAL operations.
- (c) FLIR utilization.

(2) Introduce. Single aircraft CALs in HLL.

Prerequisite. SCAL-210.

CAL-214

2.0

R A(MV-22) N NS

NSI

Goal. Review single aircraft NVD CALs in HLL.

Requirement

(1) Discuss

- (a) Aircrew coordination during NVD CAL operations.
- (b) Crew comfort level during NVD CAL operations.
- (c) FLIR utilization.

(2) Review. Single aircraft CALs in HLL.

Prerequisite. SCAL-213.

4. Formation (FORM)

a. Purpose. To review cruise and parade formation and introduce tactical formations and maneuvering.

b. Crew Requirement. P/P/CC and AO for FORM-242.

c. Academic Training

(1) Review tactical formation flight as contained in the MV-22 Tactics Manual.

(2) MAWTS-1 Academic Support Package Lecture, Tactical Formation Maneuvering, shall be completed prior to SFORM-220.

d. Simulator Training. (2 Events, 4.0 Hours).

e. Flight Training. (3 Flights, 5.5 Hours).

SFORM-220

2.0

S (FTD)

Goal. Review formation. Introduce tactical formation maneuvering and section CALs.

Requirement

(1) Discuss

- (a) Aircrew coordination.
- (b) Crew Comfort level.
- (c) Lead changes.
- (d) Common terminology.
- (e) Tactical formation maneuvering.
- (f) Nacelle Angle.
- (g) Inter/Intra-plane coordination.
- (h) Lead/Wingman responsibilities.

(2) Introduce

- (a) Break turns, center turns, pinch/dig, tac turns, in place turns, split turns, and cross turns.
- (b) Combat spread and combat cruise.
- (c) Section approaches and departures from various CAL sites.

(3) Review

- (a) Section takeoffs/landings.

(b) Cruise principles, cross-overs, break-up and rendezvous, and lead changes.

FORM-221

1.5 R A(2 MV-22)

Goal. Introduce section tactical formation maneuvering.

Requirement

(1) Discuss

- (a) Aircrew coordination.
- (b) Crew Comfort level.
- (c) Tactical formation maneuvering.
 - 1 Center turns.
 - 2 In place turns.
 - 3 Cross turns.
 - 4 Dig/Pinch.
 - 5 Tac turns right/left.
 - 6 Cover position.
 - 7 Break turns.

(2) Introduce

- (a) Break turns, center turns, pinch/dig, tac turns, in place turns, split turns, cross turns.
- (b) Combat spread and combat cruise.
- (c) Section approaches and departures from various CAL sites.

(3) Review

- (a) Section takeoffs/landings.
- (b) Cruise principles, crossovers, break-up and rendezvous, and lead changes.

FORM-222

2.0 A(3 MV-22)

Goal. Introduce Division Formation.

Requirement

(1) Discuss

- (a) Aircrew coordination.

- (b) Crew Comfort level.
- (c) Division Lead changes.
- (d) Common terminology.
- (e) Tactical formation maneuvering.
- (f) Nacelle Angle cueing.

(2) Introduce

- (a) Division lead changes.
- (b) Division approaches and departures from various CAL sites.
- (c) Division takeoffs/landings.
- (d) Cruise principles, crossovers, break-up and rendezvous, and lead changes.

Emergency Procedure. Inadvertent IMC.

SFORM-223

2.0

R S(FTD) NS

NSI

Goal. Review formation and introduce night tactical formation and maneuvering using NVGs in HLL.

Requirement

(1) Discuss

- (a) Aircrew coordination during NVD formation operations.
- (b) NVD formation techniques.
- (c) Aircraft Lighting during NVD formation.
- (d) Inadvertent IMC.
- (e) Night tactical formation maneuvering.

(2) Introduce. NVG formation.

(3) Review

- (a) Section takeoffs/landings.
- (b) Cruise principles, crossovers, break-up and rendezvous, and lead changes.

FORM-224

2.0

R A(2 MV-22) N NS

NSI

Goal. Demonstrate the ability to fly formation with NVDs in HLL.

Requirement

(1) Discuss

(a) Aircrew coordination during NVD formation operations.

(b) NVD formation techniques.

(c) Aircraft lighting during NVD formation.

(d) Inadvertent IMC.

(2) Introduce. NVD formation flight.(3) Review. FORM-221.

Prerequisite. SFORM-223 and CAL-214.

5. Tilt-Rotor Low Altitude Tactics (VLAT)a. Purpose. To qualify the PUI in VLAT operations.b. General

(1) A VLAT instructor is required for initial SVLAT-230, 232, VLAT-231, 233. A Night Systems Instructor is required for initial SVLAT-234 and VLAT-235, 236.

(2) At the completion of this stage of training the PUI is considered to be VLAT qualified and may be designated as such by the Squadron Commanding Officer.

(3) VLAT altitude restrictions and currency requirements per T&R Manual, Volume 1.

(4) All tactical and non-tactical applications of the MPS will be discussed in detail for each event. Intent is to utilize MPS to the maximum extent possible during VLAT training.

c. Prerequisite. FORM-221 complete prior to SVLAT-232 or 233. FORM-224 complete prior to SVLAT-234 or 235.

d. Crew Requirement. P/P/CC/AO.e. Academic Training

(1) The VLAT lectures listed in the MAWTS-1 Academic Support Package shall be completed prior to being designated VLAT qualified.

(2) Review appropriate paragraphs of the MV-22 Tactics Manual.

f. Simulator Training. (3 Events, 6.0 Hours).g. Flight Training. (4 Flights, 6.0 Hours).

SVLAT-230	2.0	S(FTD)	VLATI
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Goal. Demonstrate the ability to perform VLAT maneuvers and navigate a VLAT route in the contour profile.

Requirement(1) Discuss

(a) Crew coordination during VLAT navigation.

(b) Common terminology used during VLAT navigation.

(c) Hazard maps.

(d) Tactical map preparation (1:50,000 & 1:250,000).

(2) Introduce. Navigate a VLAT route with a minimum of 5 checkpoints in the contour profile and remain oriented within 500 meters of course line.

<u>VLAT-231</u>	1.5	A(MV-22)	<u>VLATI</u>
<u>Goal.</u> Demonstrate the ability to navigate a VLAT route in the contour profile.			
<u>Requirement</u>			
(1) <u>Discuss.</u> Time/distance checks.			
(2) <u>Introduce.</u> Navigate a VLAT route with a minimum of 5 check points.			
(3) <u>Review.</u> SVLAT-230.			
<u>Prerequisite.</u> SVLAT-230.			
<u>SVLAT-232</u>	2.0	R S(FTD)	<u>VLATI</u>
<u>Goal.</u> <u>Introduce</u> section VLAT navigation flight.			
<u>Requirement</u>			
(1) <u>Discuss</u>			
(a) Aircrew coordination in the VLAT environment.			
(b) VLAT techniques.			
(c) Optical flow or speed rush baseline.			
(2) <u>Introduce.</u> VLAT formation flight.			
(3) <u>Review.</u> VLAT-231 and SFORM-220.			
<u>VLAT-233</u>	1.5	R A(2 MV-22)	<u>VLATI</u>
<u>Goal.</u> Review section VLAT navigation flight.			
<u>Requirement</u>			
(1) <u>Discuss</u>			
(a) Aircrew coordination during formation flight in the VLAT environment.			
(b) Common terminology used during formation flight in the VLAT environment.			
(c) Altitude awareness.			
(2) <u>Introduce.</u> Tactical formations in the VLAT profiles while flying a VLAT route with a minimum of 5 checkpoints.			
(3) <u>Review.</u> VLAT-232.			
<u>Prerequisite.</u> FORM-221, VLAT-232.			

SVLAT-234

2.0

R S(FTD) NS

NSI

Goal. Introduce section NVD VLAT navigation flight.

Requirement

(1) Discuss

- (a) Aircrew coordination in the VLAT environment.
- (b) VLAT techniques.
- (c) Optical flow or speed rush baseline.

(2) Introduce. VLAT formation flight.

(3) Review. SFORM-223, SVLAT-232.

VLAT-235

1.5

A(MV-22) N NS

NSI

Goal Review aircraft maneuver performance and characteristics in the VLAT environment utilizing NVDs.

Requirement

(1) Discuss

- (a) NVG briefing guide.
- (b) Cockpit display configurations.
- (c) NVG HUD operations.
- (d) T/O, Enroute, Approaches and Landing procedures.
- (e) RAD ALT settings and Altitude changes.
- (f) Airspeed/Hazard avoidance.
- (g) Aircrew coordination.

(2) Review

- (a) VLAT performance checks.
- (b) Low level flight/Contour profiles in both airplane and conversion modes.
- (c) Bunt.
- (d) Roll.
- (e) FLIR, Digital map and INAV operations (By PNAC).
- (f) Review SVLAT-164.

Prerequisite. VLAT-233.

VLAT-236

1.5

R A(2 MV-22) N NS

NSI

Goal. Review section NVD VLAT navigation flight.

Requirement

(1) Discuss

(a) Aircrew coordination during formation flight in the VLAT environment.

(b) Common terminology used during formation flight in the VLAT environment.

(c) Altitude awareness.

(2) Introduce. Tactical formations in the VLAT profiles while flying a VLAT route with a minimum of 5 checkpoints.

(3) Review. FORM-224.

Prerequisite. FORM-224, VLAT-235.

6. Aerial Gunnery (AG)

a. Purpose. To develop the ability to deliver Air-To-Ground fire employing the .50 Cal. turret system. IP will stress error analysis during the employment of the gun.

b. General

(1) At the completion of this stage, the PUI will demonstrate the ability to deliver effective defensive fire from a hover, approaching the landing zone, departing the landing zone and suppression fire enroute to the landing zone.

(2) MPS will be the primary method used to complete weight and balance sheets, with paper products as the alternative, per NATOPS guidelines and Standard Operating Procedures. The PUI will utilize MPS to calculate the weight and balance for each event.

(3) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

(4) Weapons Training Officer (WTO) required for SAG-240 and AG-241. A Night Systems Instructor who is also a WTO is required for SAG-242 and AG-243.

c. Crew Requirement. P/P/CC.

d. Academics

(1) Aerial Gunnery Lectures conducted by a Weapons Training Officer (WTO) or Weapons and Tactics Instructor (WTI).

(2) MV-22 Pilot Aerial Gunnery Course, using the MAWTS-1 Course Catalog.

e. Simulator Training. (2 Events, 4.0 Hours).

f. Flight Training. (2 Flights, 3.0 Hours).

<u>SAG-240</u>	<u>2.0</u>	<u>S(FTD)</u>	<u>WTO/WTI</u>
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Goal. To introduce the PUI to aerial gunnery.

Requirement

(1) Discuss

- (a) Aircrew coordination.
- (b) ICS procedures.
- (c) Safety.
- (d) Arm/Dearm procedures and checklists.
- (e) Fire control procedures (weapons condition).
- (f) Weapon malfunctions/emergencies.

(2) Introduce

- (a) Preparation of weapons and aircraft.
- (b) Air-To-Ground weapons employment.
- (c) Firing on prebriefed targets.

Simulator Configuration. Simulator configured for 300 rounds .50 cal.

AG-241

1.5

R A(2 MV-22)

WTO/WTI

Goal. To introduce aircraft weapons employment considerations.

Requirement(1) Discuss

- (a) Aircrew coordination.
- (b) ICS procedures.
- (c) Safety.
- (d) Fire control procedures (weapons condition).
- (e) Weapon malfunction/stoppages.
- (f) Emergencies (aircraft & weapons).
- (g) Arm/Dearm checklists.

(2) Introduce

- (a) Sectors of fire.
- (b) Firing on prebriefed targets while aircraft is maneuvering to include running and hover fires.

(3) Review

- (a) Preparation of weapons and aircraft.
- (b) Air to ground gunnery.

Prerequisite. SAG-240.

Ordinance. 300 rounds .50 cal.

SAG-242

2.0

R S(FTD) NS

NSI

Goal. To introduce the PUI to aerial gunnery at night employing the Night Vision Devices on the MV-22.

Requirement(1) Discuss

- (a) Aircrew coordination.
- (b) ICS procedures.
- (c) Safety.
- (d) Fire control procedures (weapons condition).
- (e) Weapon malfunctions/emergencies.
- (f) NVD procedures/failures.

(2) Introduce

- (a) Preparation of weapons and aircraft for a night air-to-ground gunnery mission.
- (b) Air-to-Ground night weapons employment.
- (c) Firing on prebriefed targets.

Prerequisite. SAG-240.

Simulator Configuration. Simulator configured for 300 rounds .50 cal.

AG-243

1.5

R A(2 MV-22) N NS

NSI

Goal. To introduce multiple aircraft weapons employment utilizing the Night Vision Systems onboard the MV-22. (NVD and FLIR)

Requirement

(1) Discuss

- (a) Aircrew coordination.
- (b) ICS procedures.
- (c) Safety.
- (d) Fire control procedures (weapons condition).
- (e) Weapons malfunction/stoppages.
- (f) Emergencies (aircraft & weapons).
- (g) NVD procedures/failures.

(2) Introduce

- (a) Multiple aircraft operations at night.
- (b) Sectors of fire.
- (c) Firing on prebriefed targets while aircraft is maneuvering, to include running and hovering fires.

(3) Review

(a) Preparation of weapons and aircraft for night gunnery operations.

(b) Night air-to-ground gunnery.

Prerequisite. AG-241 and SAG-242.

Ordinance. 1000 rounds .50 cal.

7. External Operations (EXT)

a. Purpose. To develop proficiency in external load operations and introduce external lift operations in a confined area.

b. General (Refer to paragraph 141.2b.)

(1) All external cargo operations shall utilize HST support. A minimum of five hook-ups and deliveries will be required for successful completion of each flight event.

(2) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. Crew Requirement. P/P/CC.

d. Academic Training

(1) Read appropriate Chapters of the NATOPS Manual.

(2) Read appropriate paragraphs of the MV-22 Tactics Manual.

e. Prerequisite. CAL-212.

f. Simulator Training. (1 Event, 2.0 Hours).

g. Flight Training. (1 Flight, 2.0 Hours).

SEXT-250 2.0 S (FTD)

Goal. Introduce single point and dual point external load hook ups and drops to a confined area (conversion and airplane modes).

Requirement

(1) Discuss

(a) Aircrew coordination during external/internal hoist operations.

(b) Tactical considerations during external lift operations.

(c) Over-land and over-water hoist procedures.

(d) Converting to/and flying in airplane mode with external.

(e) Single and dual point operations.

(2) Review

(a) External load hook up and drops to a confined area.

(b) Single and dual point operations.

(c) Convert to airplane mode at least once with external.

EXT-251

2.0

R A(MV-22)

Goal. Review single point and dual point external load hook ups and drops to a confined area (conversion mode only).

Requirement

(1) Discuss

(a) Crew coordination during external/internal hoist operations.

(b) Tactical considerations during external lift operations.

(c) Over-land and over-water hoist procedures.

(d) Single and Dual Point Operations.

(2) Review. External load hook up and drops to a confined area. Complete a minimum of 3 hook up/drops for each type external.

External Syllabus Support. Helicopter Support Team.

8. Electronic Warfare (EW)

a. Purpose. To develop proficiency in the use of Aircraft Survivability Equipment (ASE) and Defensive Electronic Countermeasure (DECM) tactics.

b. General

(1) DMI in the cockpit for all instructional flights.

(2) An EW range scenario with threat emitters should be used for these events.

(3) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. Crew Requirement. P/P/CC/AO.

d. Academic Training

(1) Review appropriate paragraphs of the MV-22 Tactics Manual.

(2) Review appropriate paragraphs in the NATOPS.

(3) Review basic RADAR, tilt-rotor ESM/ECM equipment, and the MV-22 ALE program lectures from MAWTS-1 ASP.

(4) Review APR-39, ALE-47, AAR-47, and AVR-2 operating procedures.

(5) Review types of ordnance which can be used in the ALE-47.

(6) Review various threat signatures with emphasis on threat recognition.

e. Simulator Training. (1 Event, 2.0 Hours).

SEW-260

2.0

R S(FTD)

DMI

Goal. Introduce the operation of on-board ASE to include the strengths and weaknesses of ASE versus AAA, IR SAMs, and RADAR SAMs. Introduce DECM tactics vs AAA, IR SAMs, and RADAR SAMs.

Requirement(1) Discuss

(a) Operations of the ALE-47, APR-39, AAR-47, and AVR-2.

(b) The strengths and weaknesses of each ASE system versus AAA, IR SAMs, and RADAR SAMs.

(c) Aircrew coordination as it applies to the use of on-board ASE.

(d) DECM tactics against AAA, IR SAMs, and RADAR SAMs.

(e) The different tactical countermeasures (RR-129/RR-144 chaff and MK-46/MJU-27 flares).

(2) Introduce

- (a) Use of all on-board ASE.
- (b) DECM tactics against AAA, IR SAMs, and RADAR SAMs.

9. Tactics (TAC)

- a. Purpose. To introduce tactical procedures in performing all missions. Aircrew will use fragmentary orders when available.
- b. General. All tactical and non-tactical applications of the MPS will be discussed in detail for each event.
- c. Crew Requirement. P/P/CC/AO.
- d. Academic Training
 - (1) Review appropriate chapters of the MV-22 Tactics Manual.
 - (2) The following classes from the MAWTS-1 ASP should be completed prior to flying the STAC-270:
 - (a) Assault Support Mission Planning.
 - (b) Tactical Briefing and Debriefing.
 - (c) MAWTS-1 ASP - Command and Control Lecture on TACC and DASC.
 - (3) Wing/Group/Squadron Tactical SOP.
- e. Simulator Training. (2 Events, 4.0 Hours).
- f. Flight Training. (2 Flights, 4.0 Hours).

STAC-270 2.0 S (FTD)

Goal. To introduce section tactical flight in a low threat scenario.

Requirement

- (1) Discuss
 - (a) Tactical planning, briefing, and execution.
 - (b) Use of on-board ASE during the mission.
 - (c) Aircrew coordination during the ingress, objective area, and egress phases of the mission.
 - (d) Rules of engagement as they apply to the mission.
 - (e) Tactics used in a low threat environment.
 - (f) Use of on-board navigation systems.
- (2) Introduce
 - (a) Tactical planning, briefing, execution, and use of on-board navigation systems.
 - (b) T2P will assist in planning and conducting the tactical brief.

(c) Tactical missions of assigned tasks from the mission statement, emphasizing tactical formations and approaches as contained in the MV-22 Tactics Manual; radio procedures and discipline consistent with EMCON conditions, DASC control, approach and retirement routes, air control points, and escort tactics.

Simulator Configuration. The squadron S-3 will provide the simulator operator with the appropriate scenario. The simulator should be configured for ordnance, recommend 1000 rds .50 cal. and 40 chaff/20 flares.

TAC -271

2.0

R A(2 MV-22)

Goal. Review section tactical flight in a low threat scenario.

Requirement

(1) Discuss

- (a) Tactical planning, briefing, and execution.
- (b) Use of on-board ASE during the mission.
- (c) Aircrew coordination during the ingress, objective area, and egress phases of the mission.
- (d) Rules of engagement as they apply to the mission.
- (e) Tactics used in a low threat environment.
- (f) Use of on-board navigation systems.

(2) Introduce

- (a) Tactical planning, briefing, execution, and use of on-board navigation systems.
- (b) T2P will assist in planning and conducting the tactical brief.
- (c) Tactical missions of assigned tasks from the mission statement, emphasizing tactical formations and approaches as contained in the MV-22 Tactics Manual; radio procedures and discipline consistent with EMCON conditions, DASC control, approach and retirement routes, air control points and escort tactics.

Ordnance. 30 chaff and 30 flares. 300 rds .50 cal.

STAC-2722.0S(FTD) NSNSI

Goal. Introduce night section tactical flight in a low threat scenario.

Requirement

(1) Discuss

- (a) Aircrew coordination during NVD section CALs.
- (b) Tactical planning, briefing, and execution.
- (c) Use of on-board ASE during the mission.
- (d) Aircrew coordination during the ingress, objective area, and egress phase of the mission.
- (e) Rules of engagement as they apply to the mission.
- (f) Tactics used in a low threat environment.
- (g) Use of on-board navigation systems.

(2) Introduce

- (a) Section tactical approach, landing and departure to a confined area while using NVDs in HLL.
- (b) Tactical planning, briefing, execution, and use of on-board navigation systems.
- (c) T2P will assist in planning and conducting the tactical brief.
- (d) Tactical missions of assigned tasks from the mission statement, emphasizing tactical formations and approaches as contained in the MV-22 Tactics Manual; radio procedures and discipline consistent with EMCON conditions, DASC control, approach and retirement routes, air control points and escort tactics.

(3) Review. CAL-212, CAL-214, and FORM-222.

Prerequisite. CAL-212, CAL-214, and FORM-222.

Simulator Configuration. The squadron S-3 will provide the simulator operator with the appropriate scenario. The simulator should be configured for ordnance, recommend 1000 rds .50 cal. and 40 chaff/20 flares.

TAC -273

2.0

R A(2 MV-22) N NS

NSI

Goal. Review night section tactical flight in a low threat scenario.

Requirement

(1) Discuss

- (a) Aircrew coordination during NVD section CALs.
- (b) Tactical planning, briefing, and execution.
- (c) Use of on-board ASE during the mission.

- (d) Aircrew coordination during the ingress, objective area, and egress phase of the mission.
- (e) Rules of engagement as they apply to the mission.
- (f) Tactics used in a low threat environment.
- (g) Use of on-board navigation systems.

(2) Introduce

- (a) Section tactical approach, landing and departure to a confined area while using NVDs in HLL.
- (b) Tactical planning, briefing, execution, and use of on-board navigation systems.
- (c) T2P will assist in planning and conducting the tactical brief.
- (d) Tactical missions of assigned tasks from the mission statement, emphasizing tactical formations and approaches as contained in the MV-22 Tactics Manual; radio procedures and discipline consistent with EMCON conditions, DASC control, approach and retirement routes, air control points and escort tactics.

(3) Review. CAL-212, CAL-214, and FORM-222.

Prerequisite. STAC-272.

Ordnance. 40 chaff and 20 flares. 300 rds .50 cal.

10. Carrier Qualification (CQ)

a. Purpose. To develop the ability and become proficient in the conduct of flight operations from a carrier deck or air capable ship during day and night.

b. General

(1) Refer to MV-22 NATOPS and LPH/LHA/LHD NATOPS Manuals for carrier operations. Refer to NWP-42 for air capable ship operations.

(2) Minimum of five landings for each CQ/FCLP event.

(3) NSI required for initial CQ-292.

(4) IP will emphasize proper communication procedures, patterns, and aviation operations in the shipboard environment per aircraft and ship NATOPS, and T&R Manual, Volume 1.

(5) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. Crew Requirement. P/P/CC.

d. Ground Training. FCLP and carrier qualification stage lectures.

e. Simulator Training. (1 Event, 2.0 Hours).

f. Flight Training. (2 Flights, 3.0 Hours).

SCQ-290

2.0

R S(FTD)

NSI

Goal. Introduce day, night and NVG CQ pattern and procedures.

Requirement. Demonstrate/Introduce day, night, and NVG patterns, approaches and landings.

(1) Discuss

(a) Carrier operation.

1 Takeoff/Landing Patterns.

2 Communication procedures.

3 Lights and light signals.

4 LSE signals and procedures.

(b) Self-taxi procedures.

(c) STOs.

(d) Pitch-up side slip characteristics.

(e) Steady heading approach (port winds).

(f) 45° slide approach (starboard winds).

- (g) Shipboard INS alignment procedures.
- (2) Introduce
 - (a) Carrier operation.
 - 1 Takeoff/Landing Patterns.
 - 2 Communication procedures.
 - 3 Lights and light signals.
 - 4 LSE signals and procedures.
 - (b) Self-taxi procedures.
 - (c) STOs.
 - (d) Pitch-up side slip characteristics.
 - (e) Steady heading approach (port winds).
 - (f) 45ø slide approach (starboard winds).
 - (g) Shipboard INS alignment procedures.

CQ-291

1.0 R A(MV-22)

Goal. Introduce day CQ patterns and procedures in a Field Carrier Landing Practice scenario.

Requirement. Demonstrate/Introduce FCLP patterns, approaches, and landings.

- (1) Discuss. Review all SCQ-290 discussion items.
- (2) Review
 - (a) Carrier operation.
 - 1 Takeoff/Landing Patterns.
 - 2 Communication procedures.
 - 3 Lights and light signals.
 - 4 LSE signals and procedures.
 - (b) Self-taxi procedures.
 - (c) STOs.
 - (d) Pitch-up side slip characteristics.
 - (e) Steady heading approach (port winds).
 - (f) 45ø slide approach (starboard winds).

(g) Shipboard INS alignment procedures.

External Support. FCLP area.

CQ-292

2.0

R A(MV-22) N NS

NSI

Goal. Introduce night aided and unaided CQ patterns and procedures in a Field Carrier Landing Practice scenario.

Requirement. Introduce night aided patterns, approaches, and landings.

(1) Discuss

(a) Differences and similarities of day and night landing and takeoff techniques.

(b) Review CQ-291 discussion items.

(2) Review

(a) Carrier operation.

1 Night Takeoff/Landing Patterns.

2 Communication procedures.

3 Lights and light signals peculiar to night operations.

4 LSE signals and procedures.

5 Carrier aided and unaided lighting configurations.

(b) Self-taxi procedures.

(c) STOs.

(d) Pitch-up side slip characteristics.

(e) Steady heading approach (port winds).

(f) 45° slide approach (starboard winds).

(g) Shipboard INS alignment procedures.

External Support. FCLP area.

Prerequisite. CQ-291.

143. COMBAT QUALIFICATION PHASE

1. General

a. This phase of training is designed to complete proficiency in core capabilities.

b. Prior to entering any stage of training, Pilots Undergoing Instruction must complete the MAWTS-1 Course Catalog Academic Support Package lectures applicable to that stage of training.

c. Pilots shall fly all Night Systems events in this phase under ambient light conditions of .0022 LUX or less (LLL). All initial Night Systems events require an NSI.

d. The pilot under instruction is NSQ LLL at the completion of the ANSQ stage of training and shall be designated NSQ in accordance with T&R Volume 1.

e. All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

2. Carrier Qualification (CQ)

a. Purpose. To qualify the PUI in the ability to conduct flight operations from a carrier deck or ship platform under day and night conditions.

b. General

(1) Refer to MV-22 NATOPS and LPH/LHA/LHD NATOPS Manuals for carrier operations. Refer to NWP-42 for air capable ship operations.

(2) Minimum of five landings for each CQ event.

(3) CQ-301 shall be flown under HLL conditions for initial qualification. NSI required for initial NVG flights.

(4) IAW NATOPS, and MCO P3500.14_.

(5) IP will emphasize proper communication procedures, patterns, and aviation operations in the shipboard environment.

(6) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. Crew Requirement. CQ-300 and 302 - P/P/CC
CQ-301 - P/P/CC/AO.

d. Ground Training. Carrier qualification stage lectures.

e. Prerequisite. CQ-290/291/292 complete.

f. Flight Training. (3 Flights, 4.5 Hours).

CQ-300 1.5 R A(MV-22)

Goal. Day qualification flight.

Requirement. Day shipboard qualifications.

(1) Discuss

(a) Carrier operation.

1 Takeoff/Landing Patterns.

2 Communication procedures.

3 Lights and light signals.

4 LSE signals and procedures.

(b) Self-taxi procedures.

(c) STOs.

(d) Pitch-up side slip characteristics.

(e) Steady heading approach (port winds).

(f) 45° slide approach (starboard winds)

(g) Shipboard INS alignment procedures.

External Syllabus Support. Landing platform afloat.

Prerequisite. CQ-291

CQ-301 1.5 R A(MV-22) N NS NSI

Goal. Night "aided" qualification flight.

Requirement. Shipboard qualification during night operations.

(1) Discuss

(a) Aircraft lighting configurations.

(b) Deck lighting configurations.

(c) LSE signals and NVG requirements.

(d) Voice procedures at night.

(e) Closure rates and depth perception over water at night.

(f) Night waveoff signals and procedures.

(2) Introduce. Procedures for carrier landings and takeoffs using NVGs.

(3) Review

(a) Emergency procedures.

(b) Egress peculiar to shipboard operations at night utilizing NVGs.

(c) Aircrew coordination.

Prerequisite. Aircrews shall be NSQ HLL.

External Syllabus Support. Landing platform afloat.

Prerequisite. CQ-300.

CQ-302

1.5 R A(MV-22) N

Goal. Night "unaided" qualification flight.

Requirement. Shipboard qualification during night operations.

(1) Discuss

- (a) Night unaided patterns.
- (b) Unaided approaches and landings.
- (c) Aircraft lighting configuration.
- (d) Deck lighting configuration.
- (e) LSE signals.
- (f) Voice procedures.
- (g) Closure rates.
- (h) Aircraft ditching.
- (i) Emergency egress procedures.

(2) Introduce

- (a) Procedures for unaided landings and takeoffs.
- (b) Night unaided patterns.
- (c) Unaided approaches and landings.
- (d) Aircraft lighting configuration.
- (e) Deck lighting configuration.
- (f) Unaided closure rates.

(3) Review

- (a) Aircrew coordination.
- (b) Emergency Egress Lighting System (EELS).
- (c) LSE signals.

(d) Voice procedures.

External Syllabus Support. Landing platform afloat.

Prerequisite. CQ-300.

1-117

3. Night Systems (NS)

a. Purpose. To develop proficiency in the Low Light Level environment (below .0022 LUX). At the completion of this stage of training the PUI is considered NSQ LLL and may be designated NSQ by the Squadron Commanding Officer.

b. General

(1) Refer to the appropriate section in the MV-22 NATOPS Flight Manual, Tactics Manual and MAWTS-1 NVD Manual for various LZ lighting configurations.

(2) This stage of instruction requires an NSI for initial qualification and all requalification.

(3) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. Crew Requirement. NS-310/312/314 - P/P.
NS-311/313/315 - P/P/CC/AO.

d. Prerequisite. Pilot under instruction must be HLL NSQ.

e. Ground Training. Appropriate sections of the MAWTS-1 NVD Manual and MV-22 Tactics Manual.

f. Simulator Training. (3 Events, 6.0 Hours).

g. Flight Training. (3 Flights, 4.5 Hours).

SNS-310	<u>2.0</u>	S (FTD) NS	NSI
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Goal. Introduce single aircraft NVD (LLL) CALs.

Requirement

(1) Discuss

- (a) Crew comfort level during NVD (LLL) operations.
- (b) NVD (LLL) considerations.
- (c) NVD (LLL) CAL techniques.
- (d) Aircraft lighting considerations during NVD (LLL) operations.
- (e) Low altitude emergencies.

(2) Introduce. NVD (LLL) CALs.

(3) Review. CAL-214.

NS-311	<u>1.5</u>	R A(MV-22) N NS	NSI
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Goal. Review single aircraft NVD (LLL) CALs.

Requirement(1) Discuss

- (a) Crew comfort level during NVD (LLL) operations.
- (b) NVD (LLL) considerations.
- (c) NVD (LLL) CAL techniques.
- (d) Aircraft lighting considerations during NVD (LLL) operations.
- (e) Low altitude emergencies.

(2) Introduce. NVD (LLL) CALs.(3) Review. CAL-214.Prerequisite. SNS-310.SNS-3122.0 S(FTD) NSGoal. Introduce NVD section VLAT and section CALs.Requirement(1) Discuss

- (a) Aircrew coordination during NVD formation and CALs.
- (b) NVD section CAL techniques.
- (c) NVD section formation techniques.
- (d) Inadvertent IMC on NVDs.
- (e) Whiteout/Brownout in a section CAL.

(2) Demonstrate. Whiteout/Brownout in section CALs.(3) Introduce

- (a) NVD section formation.
- (b) NVD section CALs.

(4) Review. FORM-224.Prerequisite. SNS-310.NS-3131.5 R A(2 MV-22) N NSGoal. Review NVD section VLAT and section CALs.Requirement(1) Discuss

(a) Aircrew coordination during NVD formation and CALs.

(b) NVD section CAL techniques.

(c) NVD section formation techniques.

(d) Inadvertent IMC on NVDs.

(2) Introduce

(a) NVD section formation.

(b) NVD section CALs.

(3) Review. VLAT-236.

Prerequisite. NS-311.

SNS-314

2.0

R S (FTD) NS

NSI

Goal. Introduce division formation when conducting VLAT navigation.

Requirement

(1) Discuss. Time/distance checks.

(2) Introduce. Navigate a VLAT route with a minimum of five check points.

(3) Review. SNS-312.

Prerequisite. SNS-312.

NS-315

1.5

R A(3 or more MV-22) N NS

NSI

Goal. Review division formation when conducting VLAT navigation.

Requirement

(1) Introduce. Navigate a route at or above 200' AGL with at least four checkpoints remaining oriented within 500 meters of course line and arrive at the final checkpoint within 2 minutes of the planned arrival time.

(2) Review. SNS-314.

Prerequisite. NS-313, SNS-314.

4. Aerial Refueling (AR)

a. Purpose. To develop proficiency in aerial refueling.

b. General

(1) After initial proficiency is achieved, aircrew need to maintain AR-323 currency to conduct NVD aerial refueling operations.

(2) A minimum of five contacts and movement to the refueling position are required to successfully complete each flight.

(3) An ARI is required for this stage of instruction. AR-323 requires the ARI to be an NSI for initial instruction.

(4) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. Prerequisites. FORM-222 proficient.

d. Crew Requirement. SAR-320/322 - P/P
AR-321 - P/P/CC
AR-323 - P/P/CC/AO

e. External Syllabus Support. KC-130 or KC-135 tanker.

f. Ground Training

(1) Aerial Refueling stage lectures.

(2) Consult the MAWTS-1 Course Catalog for the recommended lectures in the Academic Support Package applicable to this stage of flight.

(3) The MAWTS-1 NVD Manual also provides a description of NVD Aerial Refueling. Discuss and become thoroughly familiar with all aspects of Aircrew coordination applicable to aerial refueling as described in the MV-22 NATOPS Manual and the NATOPS Air Refueling Manual (NAVAIR 0 degree -1-t-110).

g. Simulator Training. (2 Events, 3.0 Hours).

h. Flight Training. (2 Flights, 3.0 Hours).

<u>SAR-320</u>	<u>1.0</u>	<u>S(FTD)</u>	<u>ARI</u>
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Goal. Introduce aerial refueling.

Requirement

(1) Discuss

(a) Aircrew Coordination.

(b) Comfort level.

(c) Rendezvous procedures, both VMC and IMC.

(d) Join-up procedures.

- (e) Airspeeds/altitudes.
- (f) Crossovers.
- (g) Reel response.
- (h) Inadvertent disconnects.
- (i) Emergency breakaway.
- (j) Fuel siphoning.
- (k) Emergency disconnect.
- (1) EMCON Refueling.
- (2) Demonstrate/Introduce
 - (a) Introduce basic scan and flight techniques required to refuel from the KC-130.
 - (b) Rendezvous.
 - (c) Join-up.
 - (d) Contact/fuel transfer.
 - (e) Post aerial refueling procedures.
 - (f) Emergency breakaway.

Simulator Configuration. The simulator should be configured for the KC-130 using both high and low speed drogues.

AR-321

1.5

R A(MV-22)

ARI

Goal. Review day aerial refueling.

Requirement

- (1) Discuss
 - (a) Aircrew Coordination.
 - (b) Comfort level.
 - (c) Rendezvous procedures VMC conditions.
 - (d) Join-up procedures.
 - (e) Airspeeds/Altitudes.
 - (f) Cross unders.
 - (g) Reel response.
 - (h) Inadvertent disconnects.

- (i) Emergency breakaway.
- (j) Fuel siphoning.
- (k) Emergency disconnect.
- (2) Demonstrate/Introduce
 - (a) Rendezvous.
 - (b) Join-up.
 - (c) Contact/Fuel transfer.
 - (d) Post aerial refueling procedures.
 - (e) Emergency breakaway.

Prerequisite. SAR-320.

External Syllabus Support. KC-130/135 configured with a high and low speed drogues as applicable.

SAR-322

2.0

S (FTD) N NS

ARI/NSI

Goal. Introduce night unaided and aided aerial refueling.

Requirement

- (1) Discuss
 - (a) Aircrew coordination.
 - (b) Comfort level.
 - (c) Closure rates.
 - (d) Depth perception.
 - (e) Receiver/Tanker lighting.
 - (f) Visual illusions.
 - (g) Inadvertent IMC.
 - (h) Emergency procedures.
 - (i) Visual signals.
 - (j) Tanker sequence.
- (2) Demonstrate/Introduce. For the first 1.0 hour of the event, the PUI will conduct night unaided aerial refueling. NVG aerial refueling will be conducted during the second 1.0 hour.

Simulator Configuration. The simulator should be configured for the KC-130 and KC-135 using both high and low speed drogues as applicable.

Prerequisite. SAR-320.

AR-323

1.5 R E A(MV-22) N NS NSI

Goal. Review NVD aerial refueling.

Requirement. Review AR-322 while using NVDs.

(1) Discuss. Same as AR-322 plus.

(a) NVD Failures.

(b) NVD Rendezvous.

(c) A/C Lighting.

(d) Visual Signals.

Prerequisite. SAR-322.

External Syllabus Support. KC-130 or KC-135 configured with low and high speed drogues as applicable.

5. Defensive Measures (DM)

a. Purpose. To develop proficiency in DM tactics and using Electronic Warfare Principles in a medium to high threat environment with a multi-aircraft flight.

b. General

(1) DMI or ACMI required for initial instructional events.

(2) This flight shall be conducted against a threat emitter; e.g., SA-6, ZSU-23-4, etc.

(3) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. Prerequisites

(1) VLAT qualified.

(2) SEW-260.

d. Crew Requirement. P/P/CC/AO.e. Academic Training

(1) Review applicable chapters of the MV-22 Tactics Manual for electronic warfare and aircraft survivability equipment.

(2) Review appropriate chapters in the MV-22 NATOPS.

(3) Complete Basic RADAR Principles, Soviet Radio-electronics (REC), Countering the Surface-to-Air Threat, and Helo ESM/ECM Equipment prior to SDM-330.

f. Simulator Training. (1 Event, 2.0 Hours).g. Flight Training. (1 Flight, 1.5 Hours).

SDM-330	2.0	R S(FTD)	DMI or ACMI
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Goal. Develop and refine procedures to counter an ground -to-air threat with a multi-aircraft flight.

Requirement(1) Discuss

(a) Aircrew coordination/crew comfort level in a multi-plane flight.

(b) Aircraft Survivability Equipment (ASE).

(c) Multi-aircraft tactics.

(d) Use of RADAR horizons and RADAR masking techniques to defeat threat RADAR systems.

(2) Introduce

(a) Section/Division maneuvering against surface-to-air missile and RADAR threat systems on an EW range.

(b) Perform threat avoidance maneuvers and/or tactics to defeat threat systems.

(3) Review. SEW-260.

Simulator Configuration. The DMI will provide the simulator operator with the appropriate surface-to-air threat scenario.

DM-331

1.5

A(2 MV-22)

DMI or ACMI

Goal. Review procedures to counter a surface-to-air threat with a multi-aircraft flight.

Requirement(1) Discuss

(a) Aircrew coordination/crew comfort level in a multi-plane flight.

(b) ASE.

(c) Multi-aircraft tactics.

(d) Use of RADAR horizons and RADAR masking techniques to defeat threat RADAR systems.

(2) Introduce

(a) Section/Division maneuvering against surface-to-air missile and RADAR threat systems on an EW range.

(b) Perform threat avoidance maneuvers and/or tactics to defeat threat systems.

(3) Review. SEW-260.

Prerequisite. DM-330.

Ordinance. 40 chaff and 20 flares.

External Syllabus Support. EW/Threat Range.

6. Tactics (TAC)

a. Purpose. To develop proficiency in tactical planning, briefing and execution of an assault support mission in a medium threat environment, using MCCRES standards.

b. General

(1) All mission briefs require an intelligence brief. To the greatest extent possible incorporate the employment of escort aircraft (fixed or rotary wing), Aircraft Survival Equipment (ALE-47, APR-39, etc.) and wearing of the AR-5/M-24 gas mask. These events shall be conducted under the standards required in the applicable MCCRES Volume.

(2) Specific responsibilities should be delegated to pilots so they obtain a broad exposure to mission planning.

(3) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. Crew Requirement. P/P/CC/AO.

d. Academic Training

(1) Tactical Recovery of Aircraft and Personnel (TRAP), Opposing Forces Ground Tactics, Soviet IADS, Tilt-rotor Escort Tactics I and II, Assault Support Mission Planning, Tactical Briefing and Debriefing, Fire Support Coordination Measures, Tilt-rotor Weaponing and Countering the Surface-to-Air Threat from the MAWTS-1 Academic Support Package.

(2) Review appropriate chapters of the MV-22 Tactics Manual.

e. Prerequisites

(1) NSI required unless both pilots are NSQ or both pilots are NSQ for the appropriate light level in which the event is being conducted.

(2) STAC-270.

f. Simulator Training. (3 Events, 6.0 Hours).

g. Flight Training. (2 Flights, 6.0 Hours).

STAC-340 2.0 S (FTD)

Goal. Introduce assault missions in a medium threat environment using a section.

Requirement

(1) Discuss

(a) Aircrew coordination during an assault support mission.

(b) Flight countertactics for air and ground threats.

(c) ASE utilization.

- (d) Escort considerations.
 - (e) Fire support considerations and control measures.
 - (f) Control and terminology for on-board defensive weapons.
 - (g) EMCON procedures.
 - (h) NBC considerations.
 - (i) VLAT considerations.
- (2) Introduce
- (a) Mission planning using a preplanned scenario and mission.
 - (b) Tactical formations and maneuvers.
 - (c) EMCON conditions.
 - (d) Navigation time and distance checks to meet a planned L-Hour.
 - (e) Multi-plane gun shoot in an objective area/LZ, if possible.

Simulator Configuration. The squadron S-3 will provide the simulator operator with the appropriate scenario. Simulator should be configured for ordnance, recommend 1000 rds .50 cal. and 40 chaff/20 flares.

STAC-341

2.0

R S (FTD) NS

NSI

Goal. Introduce division tactics assault support missions in a medium threat environment at night.

Requirement

- (1) Discuss
- (a) Aircrew coordination during an assault support mission.
 - (b) Flight countertactics for air and ground threats.
 - (c) ASE utilization.
 - (d) Escort considerations.
 - (e) Fire support considerations and control measures.
 - (f) Control and terminology for on-board defensive weapons.
 - (g) EMCON procedures.
 - (h) NBC considerations.
 - (i) VLAT considerations.

(2) Introduce

- (a) Mission planning using a preplanned scenario and mission.
- (b) Tactical formations and maneuvers.
- (c) EMCON conditions.
- (d) Navigation time and distance checks to meet a planned L-Hour.
- (e) Multi-plane gun shoot in an objective area/LZ, if possible.

Simulator Configuration. The squadron S-3 will provide the simulator operator with the appropriate scenario. Simulator should be configured for ordnance, recommend 1000 rds .50 cal. and 40 chaff/20 flares.

TAC-342

3.0

R A(3 or more MV-22) N NS

NSI

Goal. Review division tactics for an NVD assault support mission in a medium threat environment.

Requirement(1) Discuss

- (a) Aircrew coordination conducting an NVD mission.
- (b) Escort considerations at night.
- (c) Fire support considerations at night.
- (d) NVD mission briefing.
- (e) NVD considerations during tactical missions.
- (f) Precision navigation systems.
- (g) ASE utilization for night missions.
- (h) NBC considerations.

(2) Introduce

- (a) Tactical assault support mission at night using NVDs.
- (b) EMCON control techniques.
- (c) Escort aircraft utilization, if available.
- (d) Multi-Aircraft NVD gun shoot in an objective area, if possible.

Prerequisite. STAC-341.

Ordnance. 40 chaff and 20 flares. 1000 rds of .50 cal.

STAC-343

2.0

S(FTD) NS

NSI

Goal. Multi-Aircraft High threat.

Requirement

(1) Discuss

- (a) ACE and GCE coordination during mission planning.
- (b) Tactical Aircraft Mission Planning System (TAMPS).
- (c) Immediate extract.
- (d) NVD mission planning.
- (e) On-board navigation systems.
- (f) ASE use at night.
- (g) NBC considerations.

(2) Introduce

- (a) A mission scenario using pre-determined ingress to an LZ and an egress route.
- (b) Considerations for alternate routes and LZs.

Prerequisite. STAC-342.

Simulator Configuration. The squadron S-3 will provide the simulator operator with the appropriate scenario. Simulator should be configured for ordnance, recommend 1000 rds .50 cal. and 40 chaff/20 flares.

TAC-344

3.0

R A(3 OR MORE MV-22) N NS

NSI

Goal. Review Multi-Aircraft High threat.

Requirement

(1) Discuss

- (a) ACE and GCE coordination during mission planning.
- (b) Tactical Aircraft Mission Planning System (TAMPS).
- (c) Immediate extract.
- (d) NVD mission planning.
- (e) On-board navigation systems.
- (f) ASE use at night.

(g) NBC considerations.

(2) Introduce

(a) A mission scenario using pre-determined ingress to an LZ and an egress route.

(b) Considerations for alternate routes and LZs.

Prerequisite. STAC-342.

Ordinance. 40 chaff and 20 flares. 1000 rds of .50 cal.

7. Tilt-Rotor Insertion/Extraction Techniques (VIE)

a. Purpose. To develop proficiency in Tilt-Rotor insertion and extraction techniques and procedures.

b. General

(1) NSI required for all initial Night System events.

(2) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. Crew Requirement. VIE-350 - P/P.
VIE-351,352 - P/P/CC.
VIE-353 - P/P/CC/AO.

d. External Syllabus Support. Rope Suspension Training Master and Safety Observer.

e. Academic Training. Review the MV-22 Tactics Manual and FM 7-40.

f. Simulator Training. (1 Event, 2.0 Hours).

g. Flight Training. (3 Flights, 5.0 Hours).

SVIE-350 2.0 R S

Goal. Introduce various methods of VIE.

Requirement

(1) Discuss

(a) HIGE/HOGE requirements.

(b) Aircrew coordination during fastrope, Jacobs Ladder operations, paraops, helocast, and rescue hoist ops.

(c) Voice communication/standard terminology.

(d) Current Force Order/Wing SOP.

(e) Emergency procedures.

(2) Introduce

(a) Skills involved for holding an extended hover.

(b) Troop insertion via the various techniques.

VIE-351 2.0 A(MV-22)

Goal. Introduce insertion procedures via fastrope, rappel or hoisting.

Requirement

(1) Discuss

- (a) HIGE/HOGE requirements.
- (b) Aircrew coordination. Pilots, Crew Chief, RST Master and RST Safety Observer brief together.
- (c) Voice communication/standard terminology.
- (d) ICS failure/hand and arm signals.
- (e) Current Force Order/Wing SOP.
- (f) Obstacle clearance/wave-off.
- (g) Emergency procedures.

(2) Introduce

- (a) Preflight of fast rope frame/rappel rigging.
- (b) Skills involved for holding an extended hover.
- (c) Troop insertion via fast rope/rappelling.

Prerequisite. VIE-350.

VIE-352 1.0 A(MV-22)

Goal. Introduce the conduct of SPIE Rig.

Requirement

(1) Discuss

- (a) HIGE/HOGE requirements.
- (b) Aircrew coordination. Pilots, Crew Chief, RST Master and RST Safety Observer brief together.
- (c) Voice communication/standard terminology.
- (d) ICS failures/hand and arm signals.
- (e) Current Force Order/Wing SOP.
- (f) Obstacle clearance.
- (g) Emergency procedures.

(2) Introduce

- (a) Inspection of SPIE Rig.
- (b) Skills involved for holding extended hover.
- (c) Troop Insertion/Extraction via SPIE Rig.

Prerequisite. VIE-350.

VIE-353

2.0

A (MV-22) N NSNSI

Goal. Introduce NVD VIE procedures.

Requirements

(1) Discuss

- (a) Aircrew coordination during NVD VIE operations.
- (b) NVD considerations during NVD VIE operations.
- (c) Emergency procedures during NVD VIE operations.

(2) Review

- (a) Preflight of appropriate VIE equipment.
- (b) Troop insertion via VIE.

Prerequisite. VIE-351 or VIE-352.

8. Flight Leadership (FL)

a. Purpose. Demonstrate proficiency in specific flight skills, systems knowledge, and flight leadership traits.

b. General. All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. Crew Requirement. P/P/CC/(AO as required).

d. Flight Training. (5 Flights, 7.5 Hours).

FL-390 1.5 A/S (MV-22)

Goal. Conduct a Tilt-Rotor Aircraft Commander review.

Requirement. This flight will review all practicable day operations and procedures contained in the T&R syllabus in preparation for the TAC check.

Ordinance. 200 rds .50 cal.

FL-391 1.5 A (MV-22) N (NS)

Goal. Conduct a night Tilt-Rotor Aircraft Commander review.

Requirement. Continuation of review flight to include night operations and procedures.

FL-392 1.5 E A (MV-22) (N) (NS) NATOPS Evaluator

Goal. Conduct a Tilt-Rotor Aircraft Commander check.

Requirement. Squadrons shall evaluate pilots for TAC designation at the discretion of the commanding officer per the criteria in the MV-22 NATOPS Flight Manual, OPNAVINST 3710.7, and local SOPs. This flight will cover all practicable operations and procedures contained in the T&R syllabus.

Ordinance. 200 rds .50 cal.

FL-393 1.5 A (2 MV-22) (N) (NS)

Goal. Conduct a section leader check.

Requirement. Satisfy the prerequisites defined in the applicable NATOPS Flight Manual, OPNAVINST 3710.7 and local directives for designation as a section leader. Demonstrate the leadership necessary for effective mission accomplishment. Pilots shall conduct this flight under the standards required in MCO 3501.4, MCCRES, Volume III, Marine Heavy Helicopter squadrons and/or MCO 3501.8 MCCRES, Volume IX, Special Operations. Moreover, pilots may use MV-22 Tactics Manual as a source document for planning.

FL-394 1.5 A (3+ ACFT) (N) (NS)

Goal. Conduct a division leader

Requirement. Satisfy all prerequisites defined in the applicable NATOPS Flight Manual, OPNAVINST 3710.7_ and local directives for designation as a division leader. Demonstrate the leadership necessary for effective mission accomplishment with a flight of three or more aircraft. Pilots shall conduct this flight under the standards required in MCO 3501.4, MCCRES, Volume III, Marine Heavy Helicopter squadrons and/or MCO 3501.8 MCCRES, Volume IX, Special Operations. Moreover, pilots may use the MV-22 Tactics Manual as a source document for planning.

144. FULL-COMBAT QUALIFICATION PHASE

1. General

a. This phase conducts training in core plus skill events. Prior to training in this phase of the syllabus a pilot should be complete with core skills training.

b. Prior to the conduct of any stage of training in this phase, Pilots Under Instruction must complete the appropriate MAWTS-1 Course Catalog Academic Support Package lecture(s) associated with that stage of training.

c. Pilots may fly all night system flights in this level under HLL or LLL conditions.

2. Air Combat Maneuvering (ACM)

a. Purpose. To introduce and develop proficiency in Air Combat Maneuvering (ACM).

b. General. Air Combat Maneuvering flights require the following: (see fig. 7-1 of T&R Manual Volume 1, Chapter 7).

(1) Pilots under instruction in this stage must be VLAT qualified, proficient, and current.

(2) ACMI in the cockpit for all initial instructional flights.

(3) Both pilot and copilot must be ACM T&R complete, proficient and current for non-instructional ACM flights.

(4) The flight is specifically briefed to include ACM training rules per OPNAVINST 3710.7_.

(5) Aggressor aircrew must be briefed per T&R Manual Volume 1 and brief Training Rules prior to each flight.

(6) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. External Syllabus Support. Fixed-wing and Rotary-wing Adversaries.

d. Prerequisites

(1) VLAT qualified.

(2) FORM-221.

e. Crew Requirement. P/P/CC/AO.

f. Academics

(1) Complete Tactical Aircrew Coordination Considerations, Countering the Fixed-wing Threat, Introduction to Air Combat Maneuvering, Introduction to Helicopter Air Combat Maneuvering, Helo ESM/ECM Equipment and countering the Rotary-wing Threat in the MAWTS-1 Academic Support Package prior to the first ACM flight.

(2) Read appropriate chapters in the MV-22 Tilt-rotor ACM Guide.

(3) Read appropriate chapters in the MV-22 Tactics Manual.

(4) Discuss information in the MV-22 Tactics Manual, pertaining to MV-22 energy and maneuverability versus a threat aircraft.

(5) The MAWTS-1 Helicopter Defensive Maneuvering Guide can be used as a reference for ground and in-flight training.

g. Simulator Training. (6 Events, 6.0 Hours).

h. Flight Training. (2 Flights, 2.0 Hours).

SACM-400 1.0 R S(FTD) 1 vs 1 R/W Aggressor ACMI

Goal. Introduce air combat maneuvering against a rotary-wing aggressor.

Requirement

(1) Discuss

(a) Aircrew coordination.

(b) Crew comfort level.

(c) Lookout doctrine.

(d) Common terminology.

(e) Situational awareness.

(f) ACM Training rules.

(g) Closure rate, radius of turn, and energy state.

(h) Use of ALE-47, APR-39, AVR-2, and AAR-47.

(i) Use of .50 caliber turret system.

(2) Introduce. Tilt-rotor versus helicopter air combat maneuvering with an aggressor helicopter per MAWTS-1 Tilt-rotor ACM Guide.

(3) Review. Tilt-rotor performance characteristics and NATOPS limitations.

Simulator Configuration. The squadron S-3 will provide the simulator operator with the appropriate scenario. Simulator should be configured for ordnance, recommend 1000 rds .50 cal. and 40 chaff/20 flares.

SACM-401 1.0 R S(FTD) 1 vs 1 F/W Aggressor ACMI

Goal. Introduce air combat maneuvering against a fixed-wing aggressor.

Requirement(1) Discuss

- (a) Aircrew coordination.
- (b) Crew comfort level.
- (c) Lookout doctrine.
- (d) Common terminology.
- (e) Situational awareness.
- (f) Closure rate, radius of turn and energy state.
- (g) Fixed-wing weapons parameters and considerations.
- (h) ACM training rules.

(2) Introduce. Tilt-rotor versus a single fixed-wing aggressor as contained in the MAWTS-1 Tilt-rotor ACM Guide.

Simulator Configuration. The squadron S-3 will provide the simulator operator with the appropriate scenario. Simulator should be configured for ordnance, recommend 1000 rds .50 cal. and 40 chaff/20 flares.

ACM-402

1.0 A(MV-22) 1 vs 1 F/W Aggressor ACMI

Goal. Introduce air combat maneuvering against a fixed-wing aggressor.

Requirement(1) Discuss

- (a) Aircrew coordination.
- (b) Crew comfort level.
- (c) Lookout doctrine.
- (d) Common terminology.
- (e) Situational awareness.
- (f) Optical flow or speed rush baseline.
- (g) Closure rate, radius of turn and energy state.
- (h) Fixed-wing weapons parameters and considerations.
- (i) ACM training rules.

(2) Introduce. Tilt-rotor versus a single fixed-wing aggressor as contained in the MAWTS-1 Tilt-rotor ACM Guide.

External Syllabus Support. Fixed Wing Adversary.

Ordnance. 30 chaff and 30 flares.

Prerequisite. SACM-401.

SACM-403

1.0 R S(FTD) 2 v 1 R/W

ACMI

Goal. Introduce section air combat maneuvering against a helicopter aggressor.

Requirement

(1) Discuss

- (a) Aircrew Coordination.
- (b) Lookout Doctrine.
- (c) Situational awareness.
- (d) Adversary aircraft parameters.
- (e) Adversary weapons envelopes.
- (f) Mutual support.
- (g) Tactical turns.

(2) Demonstrate/Introduce. Tactical turns per the MV-22 Tactics Manual, in response to a helicopter and fixed-wing threat (separately). Air Combat Maneuvering sequences are contained in the MAWTS-1 Tilt-rotor ACM guide.

Simulator Configuration. The squadron S-3 will provide the simulator operator with the appropriate scenario. Simulator should be configured for ordnance, recommend 1000 rds .50 cal. and 40 chaff/20 flares.

Prerequisites. SACM-400 and ACM-402.

SACM-404

1.0 R S(FTD) 2 v 1 F/W

ACMI

Goal. Introduce section air combat maneuvering against a fixed-wing aggressor.

Requirement

(1) Discuss

- (a) Aircrew Coordination.
- (b) Lookout Doctrine.
- (c) Situational awareness.
- (d) Adversary aircraft parameters.

- (e) Adversary weapons envelopes.
- (f) Mutual support.
- (g) Tactical turns.

(2) Demonstrate/Introduce. Tactical turns per the MV-22 Tactics Manual, in response to a helicopter and fixed-wing threat (separately). Air Combat Maneuvering sequences are contained in the MAWTS-1 Tilt-rotor ACM guide.

Simulator Configuration. The squadron S-3 will provide the simulator operator with the appropriate scenario. Simulator should be configured for ordnance, recommend 1000 rds .50 cal. and 40 chaff/20 flares.

ACM-405 1.0 A(2 MV-22) 2 v 1 F/W aggressor ACMI

Goal. Introduce section air combat maneuvering against a fixed-wing aggressor at high altitude.

Requirement

(1) Discuss

- (a) Aircrew Coordination.
- (b) Lookout Doctrine.
- (c) Situational awareness.
- (d) Adversary aircraft parameters.
- (e) Adversary weapons envelopes.
- (f) Mutual support.
- (g) Tactical turns.

(2) Demonstrate/Introduce. Tactical turns per the MV-22 Tactics Manual in response to the threat. Air Combat Maneuvering sequences are contained in the MAWTS-1 Tilt-rotor ACM guide.

External Syllabus Support. One F/W aircraft to serve as the adversary aircraft.

Ordnance. 30 chaff and 30 flares.

v. SACM-403 and -404.

SACM-406 1.0 R S(FTD) 2 vs 2 R/W Aggressors ACMI

Goal. Introduce section air combat maneuvering against two rotary-wing aggressors.

Requirement

(1) Discuss

- (a) Aircrew Coordination.
- (b) Lookout Doctrine.
- (c) Situational awareness.
- (d) Adversary aircraft parameters.
- (e) Adversary weapons envelopes.
- (f) Mutual Support.
- (g) Tactical turns.
- (h) Conversion mode and airplane mode.

(2) Demonstrate/Introduce. Tactical turns per the MV-22 Tactics Manual in response to a threat fixed-wing aircraft. Air Combat Maneuvering sequences are contained in the MAWTS-1 Tilt-rotor ACM Guide.

Simulator Configuration. The squadron S-3 will provide the simulator operator with the appropriate scenario. Simulator should be configured for ordnance, recommend 1000 rds .50 cal. and 40 chaff/20 flares.

Prerequisite. SACM-403 and -404.

SACM-407 1.0 R S(FTD) 2 v 2 F/W Aggressors ACMI

Goal. Introduce section air combat maneuvering against two fixed-wing aggressors at a low altitude.

Requirement(1) Discuss

- (a) Aircrew Coordination.
- (b) Lookout Doctrine.
- (c) Situational awareness.
- (d) Adversary aircraft parameters.
- (e) Adversary weapons envelopes.
- (f) Mutual Support.
- (g) Tactical turns.
- (h) Conversion mode and airplane mode.

(2) Demonstrate/Introduce. Tactical turns per the MV-22 Tactics Manual in response to a threat fixed-wing aircraft.

Air Combat Maneuvering sequences are contained in the MAWTS-1 Tilt-rotor ACM Guide.

External Syllabus Support. Two fixed-wing aircraft to serve as the aggressor.

Simulator Configuration. The squadron S-3 will provide the simulator operator with the appropriate scenario. Simulator should be configured for ordnance, recommend 1000 rds .50 cal. and 40 chaff/20 flares.

Prerequisite. SACM-403 and -404.

3. External Operations (EXT)

a. Purpose. To develop proficiency in external load operations in the VLAT environment and at night using NVDs.

b. General (Refer to paragraph 141.2b.)

(1) All external cargo operations shall utilize HST support.

(2) A minimum of five hook-ups and deliveries for successful completion EXT-412.

(3) MPS will be used to the maximum extent possible to support external load planning.

(4) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. Crew Requirement. P/P/CC. AO as required.

e. Academic Training

(1) Read appropriate Chapters of the NATOPS Manual.

(2) Read appropriate paragraphs of the MV-22 Tactics Manual.

e. Prerequisite. CAL-212.

f. Simulator Training. (2 Events, 3.0 Hours).

g. Flight Training. (1 Flight, 1.0 Hours).

SEXT-410	1.0	S(FTD)	VLATI
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Goal. Introduce VLAT external operations.

Requirement

(1) Discuss

(a) Aircrew Coordination.

(b) Comfort level.

(c) Preflight planning, including power computations, weight and balance considerations, and operational power checks.

(d) Power settling.

(e) Low altitude emergencies.

(f) Cargo jettison procedures.

(g) Pilot induced oscillations.

(h) HST operation/safety brief.

(i) Waveoffs.

(j) Reduced visibility conditions.

(k) Terrain/Obstacle clearance.

(2) Review

(a) Single and/or dual point procedures.

(b) VLAT maneuvers.

(3) Demonstrate/Introduce. VLAT externals in the low level and contour profiles.

(4) Conduct. Emphasis will be on VLAT flight with an external load vice pickup and delivery techniques. Minimum of one pickup and delivery required.

EXT-411

1.0

A (MV-22)

VLATI

Goal. Review external operations in the VLAT environment.

Requirement

(1) Discuss

(a) Aircrew coordination during VLAT external operations.

(b) Emergency procedures during VLAT external operations.

(c) Limitations on power available, speed, maneuverability and altitude during VLAT external operations.

(2) Introduce. VLAT route with a minimum of 4 checkpoints in the contour profile while carrying an external load.

(3) Review. EXT-251 and VLAT-231.

Prerequisite. SEXT-410, EXT-251, VLAT-231.

SEXT-412

2.0

R S/A (FTD) N NS

NSI

Goal. Introduce NVD VLAT externals.

Requirement(1) Discuss

- (a) Aircrew Coordination.
- (b) Comfort level.
- (c) Low altitude emergencies.
- (d) NVD failures.
- (e) Inadvertent IMC procedures.
- (f) Reduced visibility zones.
- (g) LZ lighting with chemlites.
- (h) Waveoffs.
- (i) Night external operation considerations.
- (j) HST operation/safety brief.

(2) Demonstrate/Introduce. NVD VLAT externals.(3) Conduct. Lifts may be done single or dual point.

Prerequisite. EXT-251.

4. Nuclear, Biological and Chemical (NBC)

a. Purpose. To develop proficiency in the use of the AR-5 NBC protective mask and associated NBC equipment.

b. General

(1) For safe execution of all flights, one pilot shall remain unmasked.

(2) NSI required for initial Night Systems events.

(3) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. Crew Requirement. SNBC-420,421 - P/P.
NBC-422 - P/P/CC.

d. Academics

(1) Complete NBC threat in the MAWTS-1 Academic Support Package prior to completion of NBC-421.

(2) Read the appropriate chapters of the MV-22 Tactics Manual.

(3) Read the appropriate section in MV-22 NATOPS.

e. Simulator Training. (2 Events, 2.0 Hours).

f. Flight Training. (1 Event, 1.0 Hour).

SNBC-420 1.0 R S(FTD)

Goal. Demonstrate the ability to conduct flight in an NBC environment with mask and gear donned.

Requirement

(1) Discuss

(a) Aircrew coordination while masked, to include emergency procedures and ground handling signals.

(b) Mask limitations pertaining to vision and scan.

(c) Physiological limitations and fatigue factors imposed by NBC protective equipment.

(d) Mask maintenance and factors which render the mask unserviceable.

(2) Demonstrate. Proper mask use (donning and doffing).

(3) Introduce

(a) NBC defensive suit.

(b) Start while masked.

- (c) Taxi while masked.
- (d) Takeoff and landings while masked.
- (e) Normal flight operations while masked.

SNBC-4211.0R S(FTD) NSNSI

Goal. Introduce AR-5 NBC mask while wearing NVGs.

Requirement

(1) Discuss

- (a) Aircrew coordination while masked, to include emergency procedures.
- (b) NVG limitations pertaining to vision and scan.
- (c) Physiological limitations and fatigue factors imposed by NBC protective equipment.
- (d) Mask maintenance and factors which render the mask unserviceable.

(2) Demonstrate. Proper mask use (donning and doffing).

(3) Introduce

- (a) NBC defensive suit.
- (b) Start while masked.
- (c) Taxi on NVGs while masked.
- (d) Takeoffs and landings on NVGs while masked.
- (e) Normal flight operations on NVGs while masked.

NBC-4221.0A(MV-22)

Goal. Review flight wearing NBC aviation equipment.

Requirement

(1) Discuss

- (a) Aircrew coordination while masked, to include emergency procedures and ground handling signals.
- (b) Mask limitations pertaining to vision and scan.
- (c) Physiological limitations and fatigue factors imposed by NBC protective equipment.
- (d) Mask maintenance and factors which render the mask unserviceable.

- (2) Demonstrate. Proper mask use (donning and doffing).
- (3) Introduce
 - (a) NBC defensive suit.
 - (b) Start while masked.
 - (c) Taxi while masked.
 - (d) Takeoff and landings while masked.
 - (e) Normal flight operations while masked.

Prerequisite. SNBC-420, 421.

5. Tilt-Rotor Insertion/Extraction Techniques (VIE)

- a. Purpose. To develop proficiency in VIE procedures.
- b. General. All tactical and non-tactical applications of the MPS will be discussed in detail for each event.
- c. Crew Requirement. P/P/CC.
- d. External Syllabus Support. HRST Master and Safety Observer.
- e. Prerequisite. Read Helo Cast operations in the MAWTS-1 Academic Support Package.
- f. Academic Training. Review the MV-22 Tactics Manual and FM 7-40.
- g. Flight Training. (2 Flights, 3.0 Hours).

VIE-4301.5A(MV-22)Goal. Introduce aerial delivery procedures.Requirement(1) Discuss

- (a) Aircrew coordination during aerial deliveries.
- (b) Voice communication/standard terminology during aerial deliveries.
- (c) Tactical considerations for aerial delivery of troops/cargo.
- (d) Proper rigging and preflight of equipment to be inserted by aerial delivery.

(2) Introduce. Insertion of troops/cargo by aerial delivery.VIE-4311.5A(MV-22)Goal. Introduce aerial insertion of troops and equipment via helo cast and/or soft duck (deflated rubber boat).Requirement(1) Discuss

- (a) Aircrew coordination while performing helo cast or soft duck over water.
- (b) Proper rigging and preflight of equipment to be inserted via helo cast and soft duck.
- (c) Low altitude aircraft emergencies over water.
- (d) Ditching/Water landing.

(e) Salt encrustation/compressor stall.

(f) Helo cast/soft duck aerial delivery altitudes and airspeeds.

(g) Voice communications/standard terminology.

(2) Introduce

(a) Insertion of troops and equipment by helo cast or soft duck.

(b) Preflight of aircraft, troops and equipment for helo cast or soft duck.

6. Tactics (TAC)

a. Purpose. To develop proficiency in tactical planning, briefing and execution of assault support missions in a high threat environment.

b. General

(1) Pilot under instruction should plan and brief the missions using a high threat scenario.

(2) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. Crew Requirement. P/P/CC/AGO.

d. Prerequisites

(1) NSQ.

(2) TAC-344 complete.

(3) ACM-405 complete.

(4) AR-323 complete.

e. Academic Training. Supporting Arms Coordination, FARP, Opposing Forces Concept of Operations, and Opposing Forces Organization and Equipment lectures in the MAWTS-1 academic support package.

f. Simulator Training. (1 Event, 2.0 Hours).

g. Flight Training. (1 Flights, 3.0 Hours).

TAC-440 3.0 R A(4 MV-22) N NS

Goal. To develop proficiency in NVD (LLL) tactical flight within a high threat environment using MCCRES standards.

Requirement

(1) Discuss. NVD (LLL) operational considerations.

(2) Introduce

(a) Execute a NVD (LLL) mission similar to TAC-441. Mission shall be flown at VLAT altitudes with aerial refueling included during the flight.

(b) Emphasis on navigation (both high and low altitude), timing, formation, communication discipline, authentication procedures, escort utilization, and weapons control procedures.

Ordinance. 1000 rds .50 cal., 30 chaff and 30 flares.

STAC-4412.0S/A(2+ MV-22) (NS)

Goal. Introduce flight operations in various geographic locations.

Requirement. Demonstrate mountain area training, arctic operations, and other geographic peculiar operation areas as required to familiarize aircrews with forward based operations. Incorporate FARP procedures into the training.

Simulator Configuration. The squadron S-3 will provide the simulator operator with the appropriate scenario. Simulator should be configured for ordnance, recommend 1000 rds .50 cal. and 40 chaff/20 flares.

150. INSTRUCTOR TRAINING

1. Day and Night Unaided FRS Instructor Training

a. Purpose. Develop qualified FRS Instructor Pilots for day and night unaided events using a standardized instructor training program.

b. General

(1) Fly IUT flights with a designated FRS Instructor Pilot.

(2) Pilots under instruction should fly in the right seat.

(3) All IUTs should complete every event of the IT syllabus.

(4) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. Training Objectives. All IUT flights emphasize instructional techniques, briefing, and debriefing. The IUT will be capable of demonstrating all training objectives listed for the referenced syllabus flight. Emphasis on all flights is on training objectives, method of instruction, and student problem areas. At the completion of this stage of training, the Pilot will be designated an Instructor Pilot and qualified to instruct all day and night unaided Combat Capable events in the aircraft and simulator.

d. Crew Requirement. IP/IUT/CC.

e. Simulator Training. (5 Events, 9.5 Hours).

f. Flight Training. (6 Flights, 10.0 Hours).

SFAM-500

2.0

S (FTD)

Goal. Introduce the instructor pilot brief and demonstrate standardized procedures for flight planning, preflight, and all day FAM stage maneuvers.

Requirement. IP and IUT will discuss preflight and postflight pilot briefings. IUT will observe preflight, cockpit procedures, techniques of instruction, and local course rules. Instructors shall emphasize the ability to teach, evaluate problems, and apply corrective instruction.

FAM-501

1.0

A(MV-22) N

Goal. Review all familiarization stage maneuvers at night.

Requirement. IUT will perform all night familiarization stage maneuvers with emphasis on the IUTs instructional technique.

SINST-502

2.0

A/S(MV-22/FTD) (N)

Goal. Review basic instrument, IFR planning, filing, and airway procedures.

Requirement

- (1) Discuss
 - (a) IFR planning.
 - (b) Filing a DD-175.
 - (c) Airway procedures.
 - (d) Precision/non-precision approaches.
- (2) Review
 - (a) Instrument checklist.
 - (b) Attitude instrument flight.
 - (c) Standard rate climbing and descending turns.
 - (d) Recovery from unusual attitudes.
 - (e) Vertical S-1 pattern.
 - (f) Oscar pattern.
- (3) Conduct. Fly a minimum of one precision and one non-precision approach.

SCAL-503

2.0 S (FTD)Goal. Review CAL instruction techniques.Requirement

- (1) Discuss
 - (a) Aircrew coordination.
 - (b) Comfort level.
- (2) Review. All CAL stage maneuvers.

CAL-504

1.5 A (MV-22)

Goal. Review CAL instruction techniques.Requirement

- (1) Discuss
 - (a) Aircrew coordination.
 - (b) Comfort level.
- (2) Review. All CAL stage maneuvers.

SNAV-505

2.0 S (FFS)Goal. Review navigational instructional techniques.

Requirement. Brief and fly a navigational flight introducing all onboard navigational equipment.

SFORM-506

2.0

S (FFS)

Goal. Review formation instructional techniques, formation stage maneuvers and emphasize closure rates and radius of turns.

Requirement. Brief and fly a formation flight introducing all formation maneuvers. Emphasize parade and cruise turns and section CALs.

VLAT-507

2.0

A (MV-22)

Goal. Review VLAT instructional techniques VLAT maneuvers and navigation.

Requirement. Brief and fly a VLAT flight introducing all VLAT maneuvers navigation procedures.

SEXT-508

2.0

S (FFS)

Goal. Review external operation instructional techniques.

Requirement. Brief and fly an external flight reviewing all external procedures.

(1) Discuss

- (a) Aircrew coordination.
- (b) Single and dual point operations, as appropriate.
- (c) Load computations, preflight and in-flight.
- (d) Emergency procedures.
- (e) Aircraft limitations.

(2) Review. Single and dual point operations as appropriate.

Conduct. Perform a minimum of three successful hookups and releases.

EXT-509

1.5

A (MV-22)

Goal. Review external operation instructional techniques.

Requirement

(1) Discuss

- (a) Aircrew coordination.
- (b) Single and dual point operations, as appropriate.
- (c) Load computations, preflight and in-flight.

(d) Emergency procedures.

(e) Aircraft limitations.

(2) Review. Single and dual point operations as appropriate.

(3) Conduct. Perform a minimum of three successful hookups and releases.

External Syllabus Support. HST.

STANX-510 2.0 E A(MV-22) (N)

Goal. Flight instructor standardization check.

Requirement. Instructors shall evaluate the IUT in all previously introduced stages of instruction for standardized flight procedures and instrument flight techniques.

2. Night Systems Familiarization Instructor Training

a. Purpose. Develop qualified instructor pilots for Night Vision Goggle events using a standardized flight training program.

b. General

(1) Fly IUT flights with a designated NSFI, NSI or MAWTS-1 Instructor. Certification flights in accordance with the MAWTS-1 Course Catalog will be flown with an NSI or MAWTS-1 instructor.

(2) Instructor under training should fly in the right seat.

(3) All IUTs shall complete every event of the IUT training syllabus.

(4) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. Training Objectives

(1) All IUT flights shall emphasize instructional techniques, briefing, and debriefing. The IUT will be capable of demonstrating all training objectives listed for the referenced syllabus events. Emphasis of all flights is on training objectives, method of instruction, and student problem areas. At the completion of this stage of training, the pilot will be designated a Night Systems Familiarization Instructor (NSFI) and qualified to instruct all Night Vision Goggle Combat Capable HLL events.

(2) The MAWTS-1 Course Catalog contains the prerequisites and course training requirements for this stage of training.

d. Crew Requirement. IP/IUT/CC/AO.

e. Flight Training. (4 Flights, 4.0 Hours).

NVG-560 Refer to MAWTS-1 Course Catalog.

NVG-561 Refer to MAWTS-1 Course Catalog.

NVG-562 Refer to MAWTS-1 Course Catalog.

NVG-563 Refer to MAWTS-1 Course Catalog.

3. Aerial Refueling Instructor (ARI)

a. Purpose. Develop proficiency in instructional procedures for all phases of aerial refueling.

b. General

(1) Complete flights in numerical order.

(2) ARIs do not require NSI designation.

(3) An ARI is required to certify additional squadron ARIs.

(4) The completion of AR-511 and AR-512 satisfy the requirements for ARI.

(5) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. Flight Training. (2 Flights, 2.0 Hours).

ARI-511 1.0 A (MV-22)

Goal. Demonstrate aerial refueling proficiency and instructional technique in the day environment.

Requirement. Review aerial refueling procedures, emergency procedures, and flight briefing. IUT to brief flight.

ARI-512 1.0 A (MV-22) N NS

Goal. Demonstrate NVG aerial refueling proficiency and instructional technique.

Requirement. Review AR-323 emphasizing use of NVGs.

4. FRS Simulator Instructor Training

a. Purpose. Develop qualified FRS Simulator Instructor for simulator events using a standardized instructor training program.

b. General

(1) Conduct IUT events with a designated FRS Simulator Instructor.

(2) IUTs should fly in the right seat.

(3) All IUTs should complete every event of the IT syllabus.

(4) All tactical and non-tactical applications of the MPS will be discussed in detail for each event.

c. Training Objectives. All IUT events emphasize instructional techniques, briefing, and debriefing. The IUT will be capable of demonstrating all training objectives listed for the referenced syllabus events. Emphasis on all events is on training objectives, method of instruction, and student problem areas. At the completion of this training,

the IUT will be designated a Simulator Instructor and qualified to instruct all Combat Capable simulator events.

d. Crew Requirement. SIMI/IUT.

e. Prerequisites

(1) MAWTS-1 ASP Night Vision Goggle Lectures.

(2) NITE Lab.

f. Simulator Training. (12 Events, 19.0 Hours).

SFAM-520

2.0

S(FTD)

Goal. Introduce the instructor pilot brief and demonstrate standardized procedures for flight planning, preflight, and all day FAM stage maneuvers.

Requirement. IP and IUT will discuss preflight and Postflight pilot briefings. IUT will observe preflight, cockpit procedures, techniques of instruction, and local course rules. Instructors shall emphasize the ability to teach, evaluate problems, and apply corrective instruction.

SFAM-521

1.0

S(FFS) N

Goal. Review all familiarization stage maneuvers at night.

Requirement. IUT will perform all night familiarization stage maneuvers with emphasis on the IUTs instructional technique.

INST-522

2.0

S(FTD) (N)

Goal. Review basic instrument, IFR planning, filing, and airway procedures.

Requirement

(1) Discuss

(a) IFR planning.

(b) Filing a DD-175.

(c) Airway procedures.

(d) Precision/non-precision approaches.

(2) Review

(a) Instrument checklist.

(b) Attitude instrument flight.

(c) Standard rate climbing and descending turns.

(d) Recovery from unusual attitudes.

(e) Vertical S-1 pattern.

(f) Oscar pattern.

(3) Conduct. Fly a minimum of one precision and one non-precision approach.

SCAL-523

1.5 S (FFS)

Goal. Review CAL instruction techniques.

Requirement

(1) Discuss

(a) Aircrew coordination.

(b) Comfort level.

(2) Review. All CAL stage maneuvers.

SCAL-524

1.5 S (FFS) N NS

Goal. Review CAL instruction techniques.

Requirement

(1) Discuss

(a) Aircrew coordination.

(b) Comfort level.

(2) Review. All CAL stage maneuvers.

SFORM-525

1.5 S (FFS)

Goal. Review formation instructional techniques, formation stage maneuvers and emphasize closure rates and radius of turns.

Requirement. Brief and fly a formation flight introducing all formation maneuvers. Emphasize parade and cruise turns and section CALs.

SFORM-526

1.5 S (FFS) NS

Goal. Review formation instructional techniques utilizing NVDs (HLL).

Requirement. Brief and fly a night formation flight reviewing all formation maneuvers. Emphasize cruise turns and section CALs.

SVLAT-527

1.5 S (FFS)

Goal. Review VLAT instructional techniques VLAT maneuvers and navigation.

Requirement. Brief and fly a VLAT flight introducing all VLAT maneuvers and navigational procedures.

SVLAT-528

1.5 S(FFS) NS

Goal. Review VLAT instructional techniques utilizing NVDs (HLL).

Requirement. Brief and fly a night VLAT flight reviewing all maneuvers and navigational procedures.

SEXT-529

1.5 S(FFS)

Goal. Review external operation instructional techniques.

Requirement. Brief and fly an external flight reviewing all external procedures.

(1) Discuss

- (a) Aircrew coordination.
- (b) Single and dual point operations, as appropriate.
- (c) Load computations, preflight and in-flight.
- (d) Emergency procedures.
- (e) Aircraft limitations.

(2) Review. Single and dual point operations as appropriate.

(3) Conduct. Perform a minimum of three successful hookups and releases.

SEXT-530

1.5 S(FFS) NS

Goal. Review night external operation instructional techniques.

Requirement. Brief and fly an external flight reviewing all external procedures.

(1) Discuss

- (a) Aircrew coordination using NVDs.
- (b) Single and dual point operations at night.
- (c) Load computations, preflight and in-flight.
- (d) Emergency procedures emphasis on NVDs.

(2) Review. Single and dual point operations as appropriate.

(3) Conduct. Perform a minimum of three successful hookups and releases.

STANX-5312.0E S(FFS) (N)

Goal. Flight instructor standardization check.

Requirement. Instructors shall evaluate the IUT in all previously introduced stages of instruction for standardized flight procedures and instrument flight techniques.

151. REQUIREMENTS, QUALIFICATIONS, AND DESIGNATIONS (RQD)

1. Purpose. Determine qualification for designation in specific flight skills, systems knowledge, and flight leadership abilities.

2. General. Squadrons should use this phase of training for check flights and designations.

3. Crew Requirement. P/P/CC (AO as required).

4. Flight Training. (5 Flights, 8.5 Hours).

RQD-600 1.5 E A(MV-22) (N) (NS)

Goal. Conduct annual NATOPS evaluation.

Requirement. The proficiency expected by the evaluator in this flight shall be commensurate with the experience level and highest flight leadership designation of the pilot under evaluation.

Prerequisite. The open and closed book NATOPS examinations shall be completed prior to the commencement of the checkflight.

RQD-601 2.0 E A/S(MV-22/FTD) (N) (NS)

Goal. Conduct annual instrument evaluation.

Requirement. Evaluate all phases of instrument flight to include precision and non-precision approaches, partial panel, and holding. Demonstrate proficiency in handling instrument related emergencies to include unusual attitude recoveries.

Prerequisite. Completion of Instrument Ground School and all instrument requirements per OPNAVINST 3710.7_ prior to the commencement of the checkflight.

RQD-602 1.5 E A(2 Div+) (N) (NS)

Goal. Conduct a flight leader check.

Requirement

(1) Brief and lead a multi-division mission, emphasizing flight coordination, flight discipline, inadvertent IMC, rendezvous procedures, and in-flight emergency coordination.

(2) At the completion of flight, perform an inadvertent IMC breakup maneuver in VMC conditions.

(3) Squadrons shall evaluate pilots for designation at the discretion of the commanding officer per the criteria in the CH-53 NATOPS Flight Manual, OPNAVINST 3710.7_, and local SOPs.

(4) Pilots shall conduct this flight under the standards required in MCO 3501.4, MCCRES, Volume III, Marine Heavy Helicopter squadrons and/or MCO 3501.8 MCCRES, Volume IX,

Special Operations. Moreover, pilots may use NWP 3-22.5-MV-22 Tactics Manual as a source document for planning.

RQD-603

1.5 E A(2+Div) (N) (NS)

Goal. Conduct a mission commander check.

Requirement

(1) Mission commander is a function of flight leadership, maturity, and experience. The mission commander should be evaluated on his ability to integrate the six functions of Marine aviation. The mission commander should lead the mission from a C&C aircraft, if available.

(2) Pilots shall conduct this flight under the standards required in MCO 3501.4, MCCRES, Volume III, Marine Heavy Helicopter squadrons and/or MCO 3501.8 MCCRES, Volume IX, Special Operations. Moreover, pilots may use NWP 3-22.5-MV-22 Tactics Manual as a source document for planning.

RQD-604

2.0 E A(MV-22)

Goal. Conduct a functional check pilot evaluation.

Requirement. Squadrons shall evaluate pilots for designation at the discretion of the commanding officer per the criteria in the MV-22 NATOPS Flight Manual, OPNAVINST 3710.7, and local SOPs. Squadrons shall base this evaluation on completion of a locally prepared syllabus.

152. GRADUATE LEVEL COURSES

1. There are five graduate level courses that qualify instructors for specific portions of the T&R syllabus. These courses are as follows:

- a. Weapons and Tactics Instructor (WTI).
- b. Tilt-rotor Low Altitude Training Instructor (VLATI).
- c. Night Systems Familiarization Instructor (NSFI).
- d. Night Systems Instructor (NSI).
- e. Defensive Measures Instructor (DMI).
- f. Air Combat Maneuvering Instructor (ACMI).
- g. Aerial Refueling Instructor. (ARI)

2. The MAWTS-1 Course Catalog contains the above courses and the appropriate training codes. The community considers each particular stage of the T&R syllabus sufficient to maintain proficiency as an instructor.

160. ORDNANCE REQUIREMENTS. These requirements are based on a "per crew" basis per OPNAVNOTE 8010.

*Annual Ordnance requirements maintains core competency.

T&R MANUAL, VOLUME 8

AIRCRAFT: MV-22

MOS: 7532

CREW POSITION: PILOT

<u>STAGE</u>	EVENT TRNG CODE	HRS	REFLY INTERVAL	<u>CRP</u>	R	M	E	REMARKS
COMBAT CAPABLE PHASE								
SFAM	100	2.0	*	0.5	X	X		S CPT
SFAM	101	2.0	*	0.5	X			S CPT
SFAM	102	2.0	*	0.6				S FFS
SFAM	103	2.0	*	0.6				S FFS
SFAM	104	2.0	*	0.6				S FFS
SFAM	105	2.0	*	0.6				S FFS
SFAM	106	2.0	*	0.6				S FFS
SFAM	107	<u>2.0</u>	*	0.6	X			S FFS
SFAM	108	2.0	*	0.6	X			S FFS
SFAM	109	2.0	*	0.6	X	X		S FFS
SFAM	110	2.0	*	0.6	X	X		S FFS
FAM	111	1.5	*	0.6				A
FAM	112	1.5	*	0.6				A
FAM	113	2.0	*	0.6				A
FAM	114	1.5	*	0.6				A
FAM	115	1.5	*	0.6	X			A
FAM	116	2.0	*	0.6	X			A
SFAM	117	2.0	*	0.6		X		S FFS
FAM	118	1.5	*	0.6	X	X		A
SFAM	119	2.0	*	0.6				S N FFS
FAM	120	1.5	*	0.6				A N
SFAM	121	2.0	*	0.6	X	X		S NS FFS
FAM	122	1.5	*	0.6	X	X		A N NS
SINST	130	2.0	*	0.6				S (N) FTD
SINST	131	2.0	*	0.6				S (N) FTD
SINST	132	2.0	*	0.6				S (N) FTD
SINST	133	2.0	*	0.6	X			S/A (N) FFS
SINST	134	2.0	*	0.6	X	X		S/A (N) FFS
INST	135	2.0	*	0.6	X			A/S (N)
INST	136	2.0	*	0.6	X	X		A/S (N)
SCAL	140	2.0	*	0.6				S FFS
CAL	141	1.5	*	0.6	X			A
SCAL	142	2.0	*	0.6	X			S NS FFS
CAL	143	1.5	*	0.6	X			A N NS
SNAV	150	2.0	*	0.6				S FFS
NAV	151	1.5	*	0.6	X			A
SNAV	152	2.0	*	0.6		X		S NS FFS
NAV	153	1.5	*	0.6	X	X		A N NS
SVLAT	160	2.0	*	0.6				S FFS
SVLAT	161	2.0	*	0.6				S FFS
VLAT	162	1.5	*	0.6	X			A
VLAT	163	1.5	*	0.6	X	X		A
SVLAT	164	2.0	*	0.6	X			S NS FFS

Figure 8-1.--MOS 7532 Refly Interval, Combat Readiness Percentages

T&R MANUAL, VOLUME 8

AIRCRAFT: MV-22

MOS: 7532

CREW POSITION: PILOT

<u>STAGE</u>	<u>EVENT</u> <u>TRNG CODE</u>	<u>HRS</u>	<u>REFLY</u> <u>INTERVAL</u>	<u>CRP</u>	<u>R</u>	<u>M</u>	<u>E</u>	<u>REMARKS</u>
SFORM	170	2.0	*	0.6				S FFS
SFORM	171	2.0	*	0.6				S FFS
FORM	172	2.0	*	0.6	X			A 2-ACFT
SFORM	173	2.0	*	0.6	X	X		S NS FFS
FORM	174	2.0	*	0.6				A N NS 2-ACFT
EXT	180	2.0	*	0.6		X		S FFS
SEXT	181	2.0	*	0.6		X		S NS FFS
EXT	182	1.5	*	0.6	X			A
EXT	183	2.0	*	0.6	X			A
EXT	184	1.5	*	0.6				A N NS
SREV	190	1.0	*	0.8	X	X		S FFS
SREV	191	2.0	*	0.8				S FFS
REV	192	1.5	*	0.8	X			A
CCX	193	2.0	*	1.0	X	X		A
COMBAT READY PHASE								
SFAM	200	2.0	*	0.2				S N FTD
FAM	201	1.5	12	0.2				A N
SFAM	202	1.0	1	0.2				S FTD
SCAL	210	2.0	12	0.4				S FTD
CAL	211	2.0	6	0.5				A
CAL	212	2.0	12	0.5	X			A
SCAL	213	2.0	6	0.4	X			S NS FTD
CAL	214	2.0	3	0.5	X			A N NS
SFORM	220	2.0	12	0.4				S FTD
FORM	221	2.0	8	0.4				A
FORM	222	1.5	6	0.4	X			A
SFORM	223	2.0	12	0.4	X			S NS FTD
FORM	224	2.0	4	0.5	X			A N NS
SVLAT	230	2.0	12	0.4				S FTD
VLAT	231	1.5	12	0.4				A
SVLAT	232	2.0	8	0.4	X			S FTD
VLAT	233	1.5	6	0.4	X			A
SVLAT	234	2.0	8	0.4	X			S NS FTD
VLAT	235	1.5	4	0.5				A N NS
VLAT	236	1.5	4	0.5	X			A N NS
SAG	240	2.0	6	0.4				S FTD
AG	241	1.5	12	0.5	X			A 2-ACFT
SAG	242	2.0	6	0.4	X			S NS FTD
AG	243	1.5	12	0.5	X			A N NS 2-ACFT
SEXT	250	2.0	12	0.4				S FTD
EXT	251	2.0	6	0.4	X			A

Figure 8-1.--MOS 7532 Refly Interval, Combat Readiness Percentages (cont).

AIRCRAFT: MV-22

MOS: 7532

CREW POSITION: PILOT

STAGE	EVENT TRNG CODE	HRS	REFLY INTERVAL	CRP	R	E	REMARKS
SEW	260	2.0	6	0.4	X		S FTD
STAC	270	2.0	6	0.5			S FTD
TAC	271	2.0	12	1.0	X		A 2-ACFT
STAC	272	2.0	4	0.5			S NS FTD
TAC	273	2.0	8	1.0	X		A N NS 2-ACFT
SCQ	290	2.0	12	0.3	X		S FTD
CQ	291	1.0	12	0.3	X		A
CQ	292	2.0	12	0.4	X		A N NS
COMBAT QUALIFICATION PHASE							
CQ	300	1.5	12	0.5	X		A
CQ	301	1.5	12	0.5	X		A N NS
CQ	302	1.5	*	0.5	X		A N
SNS	310	2.0	12	1.0			S NS FTD
NS	311	1.5	8	1.0	X		A N NS
SNS	312	2.0	12	1.0			S NS FTD
NS	313	1.5	8	1.0	X		A N NS 2-ACFT
SNS	314	2.0	12	1.0	X		S NS FTD
NS	315	1.5	6	1.0	X		A N NS 3+ ACFT
SAR	320	1.0	12	0.5			S FTD
AR	321	1.5	6	0.5	X		A
SAR	322	2.0	12	0.5			S NS FTD
AR	323	1.5	6	0.5	X		A N NS
SDM	330	2.0	3	0.5	X		S FTD
DM	331	1.5	6	1.0			A (N) (NS) 2-ACFT
STAC	340	2.0	12	1.0			S FTD
STAC	341	2.0	12	1.0	X		S NS FTD
TAC	342	3.0	8	1.0	X		A N NS 3+ACFT
STAC	343	2.0	12	1.0			S N NS FTD
TAC	344	3.0	6	1.0	X		A N NS 3+ACFT
SVIE	350	2.0	12	0.3	X		S FTD
VIE	351	2.0	12	0.3			A
VIE	352	1.0	12	0.3			A
VIE	353	2.0	12	0.6			A N NS
FL	390	1.5	*	0.5			A/S
	391	1.5	*	0.5			A N (NS)
	392	1.5	*	0.5			A (N) (NS)
	393	1.5	*	0.5			A (N) (NS)
	394	1.5	*	0.5			A (N) (NS)

Figure 8-1.--MOS 7532 Refly Interval, Combat Readiness Percentages (cont).

AIRCRAFT: MV-22

MOS: 7532

CREW POSITION: PILOT

STAGE	EVENT TRNG CODE	HRS	REFLY INTERVAL	CRP	R	E	REMARKS
FULL-COMBAT QUALIFICATION PHASE							
SACM	400	1.0	12	0.2	X		S 1V1 RW AGGR FTD
SACM	401	1.0	12	0.2	X		S 1V1 FW AGGR FTD
ACM	402	1.0	12	0.3			A 1V1 FW AGGR
SACM	403	1.0	12	0.2	X		S 2V1 RW AGGR FTD
SACM	404	1.0	12	0.2	X		S 2V1 FW AGGR FTD
ACM	405	1.0	12	0.4			A 2V1 FW AGGR
SACM	406	1.0	12	0.2	X		S 2V2 RW AGGR FTD
SACM	407	1.0	12	0.2	X		S 2V2 FW AGGR FTD
SEXT	410	1.0	12	0.3			S FTD
EXT	411	1.0	12	0.3			A
SEXT	412	2.0	12	0.3	X		S/A N NS FTD
SNBC	420	1.0	12	0.2	X		S FTD
SNBC	421	1.0	12	0.2	X		S NS FTD
NBC	422	1.0	12	0.4			A
VIE	430	1.5	12	0.3			A
VIE	431	1.5	12	0.3			A
TAC	440	3.0	12	0.4	X		A N NS 4-ACFT
STAC	441	2.0	12	0.4			S/A NS 2+ACFT FTD

INSTRUCTOR TRAINING

1. FRS INSTRUCTOR

SFAM	500	2.0	*	0.0			S FTD
FAM	501	1.0	*	0.0			A N
SINST	502	2.0	*	0.0			A/S (N)
SCAL	503	2.0	*	0.0			S FTD
CAL	504	1.5	*	0.0			A N NS
SNAV	505	2.0	*	0.0			A
SFORM	506	2.0	*	0.0			A
VLAT	507	2.0	*	0.0			A
SEXT	508	2.0	*	0.0			S FTD
EXT	509	1.5	*	0.0			A
SSTANX	510	2.0	*	0.0			S/A FTD

2. AERIAL REFUELING INSTRUCTOR

AR	511	1.0	*	0.0			A
AR	512	1.0	*	0.0			A N NS

Figure 8-1.--MOS 7532 Refly Interval, Combat Readiness Percentages (cont).

AIRCRAFT: MV-22

MOS: 7532

CREW POSITION: PILOT

<u>STAGE</u>	EVENT TRNG CODE	HRS	REFLY INTERVAL	<u>CRP</u>	R	E	REMARKS
3. FRS SIMULATOR INSTRUCTOR							
SFAM	520	2.0	*	0.0			S FTD
SFAM	521	1.0	*	0.0			S FFS N
SINST	522	2.0	*	0.0			S FTD (N)
SCAL	523	1.5	*	0.0			S FFS
SCAL	524	1.5	*	0.0			S FFS NS
SFORM	525	1.5	*	0.0			S FFS
SFORM	526	1.5	*	0.0			S FFS NS
SVLAT	527	1.5	*	0.0			S FFS
SVLAT	528	1.5	*	0.0			S FFS NS
SEXT	529	1.5	*	0.0			S FFS
SEXT	530	1.5	*	0.0			S FFS NS
SSTANX	531	2.0	*	0.0			S FFS (N)

REQUIREMENT, QUALIFICATIONS, DESIGNATIONS

RQD	600	1.5	12	0.0	X	A (N) (NS)
	601	2.0	12	0.0	X	A/S (N) (NS)
	602	1.5	*	0.0	X	A (N) (NS) 2 Div+
	603	1.5	*	0.0	X	A (N) (NS) 2 Div+
	604	2.0	*	0.0	X	A

Figure 8-1.--MOS 7532 Refly Interval, Combat Readiness Percentages (cont).

MV-22 PILOT FLIGHT UPDATE CHAINING

<u>STAGE</u>	<u>FLIGHT</u>	<u>FLIGHTS UPDATED</u>
FAM	200	201
	201	200
	202	
CAL	210	
	211	210
	212	211
	213	210, 211
	214	210, 211, 213
FORM	220	210
	221	210, 211, 220
	222	
	223	210, 213, 214, 221
	224	210, 213, 214, 221, 223
VLAT	230	
	231	230
	232	230, 231
	233	230, 231, 232
	234	230, 231, 232, 233
	235	230, 231, 232, 233, 234
	236	230, 231, 232, 233, 234, 235
AG	240	
	241	240
	242	240, 241
	243	240, 241, 242
EXT	250	
	251	250
EW	260	
TAC	270	210, 260
	271	210, 211, 260
	272	213, 260
	273	213, 214, 260
CQ	290	
	291	290
	292	290, 291
CQ	300	
	301	300, 302
	302	300
NS	310	213, 214
	311	213, 214, 310
	312	223, 234, 310, 311
	313	223, 224, 234, 235, 310, 311, 312
	314	223, 234, 310, 311, 312, 313
	315	223, 224, 234, 235, 310, 311, 312, 313, 314

Figure 8-2.--MV-22 Pilot Flight Update Chaining.

MV-22 PILOT FLIGHT UPDATE CHAINING

<u>STAGE</u>	<u>FLIGHT</u>	<u>FLIGHTS UPDATED</u>
AR	320	
	321	320
	322	320, 321
	323	320, 321, 322
DM	330	260
	331	260, 330
TAC	340	270, 271, 272
	341	270, 271, 272, 340
	342	270, 271, 272, 273, 340, 341
	343	270, 271, 272, 273, 340
	344	270, 271, 272, 273, 340, 341, 343
VIE	350	
	351	350
	352	350
	353	350
FL	390	
	391	
	392	
	393	
	394	
ACM	400	
	401	400
	402	400, 401
	403	400, 401, 402
	404	400, 401, 402, 403
	405	400, 401, 402, 403, 404
	406	400, 401, 402, 403, 404, 405
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Figure 8-2.--MV-22 Pilot Flight Update Chaining (cont).

CHAPTER 2

MV-22 CREW CHIEF/AERIAL OBSERVER

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CHAPTER 2

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* * N O T E * *

Aircrew coordination will be briefed for all flights and aircrew positions.

MARINE MEDIUM TILT-ROTOR SQUADRON - MV-22
UNIT TEMPLATE

1. TABLE OF ORGANIZATION

PAA = 12 MV-22
28 Pilots
20 Crew Chiefs
19 Gunner/Observer

2. SQUADRON CORE CAPABILITY

a. A core capable squadron is able to sustain the following minimum performance on a daily basis during sustained contingency/combat operations, assuming 100% PAA, 90% in reporting status and 90% T/O on hand in all MOS's. If < 90%, core capability will be degraded by a like percentage. The extent to which a core capable squadron is able to surge beyond its core capability is situational dependent.

b. Within a 24-hour period, a core capable squadron is able to sortie 2 four plane divisions (or flight of eight) of mission capable aircraft crewed by NSQ aircrew on any mission essential task in a medium threat environment.

3. BASIC AIRCREW QUALIFICATIONS. As a minimum, in order to be considered Core Competent, a squadron must possess the following numbers of aircrew who are 100% complete in each listed core skill. (Note: If a squadron is < T/O, required numbers are reduced by a like %)

{li P350034h.gif:Basic Aircrew Qualification}

4. REQUIRED CORE SKILLS AND SORTIES. As a minimum, in order to be considered core skills complete, an individual must complete the sorties listed in the table below. Initial aircrew must fly all sorties. Refresher aircrew, previously core skill complete in a specific core skill, at a minimum must complete the "R" coded sorties.

{li P350034i.gif:Required core skills and sorties}

. SORTIES REQUIRED TO MAINTAIN CORE SKILLS. For each twelve month period after achieving competency, a Crew Chief would be required to fly the following number of sorties in each skill area to maintain that competency. These values satisfy the refly factor for proficiency and maintain currency requirements.

{li P350034j.gif:Sorties required to maintain core skills}

6. FLIGHT LEADER/INSTRUCTOR QUALIFICATIONS. As a minimum, in order for a squadron to be considered Core Competent, it must possess the following numbers of aircrew in the listed flight leadership/instructor categories. (Note: If the squadron is < T/O, required numbers are reduced by a like %)

{li P350034k.gif:Flight Leader/Instructor Qualification}

7. SORTIES REQUIRED TO QUALIFY FOR DESIGNATION AS CREW CHIEF INSTRUCTOR

{li P350034l.gif:Sorties required to qualify for Crew Chief Instructor}

200. PROGRAMS OF INSTRUCTION (POI) FOR BASIC AND TRANSITION CREW CHIEF

<u>WEEKS</u>	<u>COURSE/PHASE</u>	<u>ACTIVITY</u>
1-2	MV-22 Familiarization	FREST
3-6	Ground Schools	Training Squadron
6-18	Combat Capable Phase	Training Squadron
19-26	Flight Training	Tactical Squadron

201. POI FOR REFRESHER CREW CHIEF

<u>WEEKS</u>	<u>COURSE/PHASE</u>	<u>ACTIVITY</u>
1-2	MV-22 Familiarization	Trng/TAC Squadron
3-4	Ground Schools/OJT	Trng/TAC Squadron
5-13	Flight Training	Tactical Squadron

202. POI FOR BASIC, TRANSITION, AND REFRESHER AERIAL OBSERVER

<u>WEEKS</u>	<u>COURSE/PHASE</u>	<u>ACTIVITY</u>
1-2	Ground School	Tactical Squadron
3-15	Flight Training	Tactical Squadron

210. GROUND TRAINING COURSES OF INSTRUCTION

<u>COURSE</u>	<u>ACTIVITY</u>
SERE School	JT Training
MV-22 Power Plants and Related/Rotors	FREST
Aviation Physiology/ Aviation Water Survival	
Low Altitude Training	Trng/TAC Squadron
NITE Lab	Trng/TAC Squadron
Night Vision Goggles	Trng/TAC Squadron
SERE	Brunswick

211. AIRCREW TRAINING REFERENCES. Aircrews shall use the following references to ensure safe and standardized training and maintenance procedures, grading criteria, and aircraft operation:

OPNAVINST 3710.7_	NATOPS General Flight and Operations
OPNAVINST 4790.2_	Naval Aviation Maintenance Program
NAVAIR 00-80T-106	LHA/LPH/LHD NATOPS Manual
NWP-42	Shipboard Helicopter Operations Manual
NAVAIR 01-230-HMA-1	MV-22 NATOPS Flight Manual
MCO P3500.14	T&R Manual, Volume 1
MCO P4790.12	Individual Training Standards Systems (MATMEP)
MCO 3501.4	Marine Corp Combat Readiness and Evaluation System
MCO 3500.27/OPNAV 3500.39	Operational Risk Management
MAWTS-1 Course Catalog	

212. SQUADRON LEVEL TRAINING

MAWTS-1 Enlisted Aircrew Academic Support Package
NATOPS Manual
Rappel Operations
MV-22 TAC Manual
Rope Suspension Training
Publications and Related Directives
Search and Rescue
Communication Procedures
Shipboard Operations and Procedures, Fueling and Servicing
Terrain Flight Introduction
Ground Handling
TRAP
Helicopter Loading/Equipment Storage
Tactical Briefing/Debriefing
Maint Procedures and Troubleshooting
AN/ALE-47 Programming (S)
Safety
APR-39 Trainer (15E36) (S)
Survival and First Aid
Helo ESM/ECM Equipment (S)
MV-22 FARP
Countering the FW Threats
External Operations
Countering Surface-to-Air Threats (S)
Helicopter Insertion/Extraction Ops.
Countering the RW Threat (S)
MAGTF Organization/Equipment
Helicopter Defensive Measures
MAGTF: The Amphibious Assault
NBC Threat (S)
Map Reading
Recognition Training
Night Vision Systems
Soviet model IADS
Night Vision Techniques
Tactical Formation Maneuvering
Tactical Aircrew Coordination
Considerations

220. FLIGHT TRAINING FOR BASIC AND TRANSITION CREW CHIEF

1. Combat Capable Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>	<u>CRP</u>
<u>ACFT/SIM</u>			
<u>ACFT/SIM</u>			
Familiarization	7/1	11.0/2.0	14.0/2.0
Internal Loads	3/0	5.5/0.0	6.0/0.0
Confined Area Landings	3/1	4.5/2.0	9.0/2.0
Navigation	1/1	1.5/2.0	2.0/2.0
Tilt-Rotor Low Altitude Tactics	2/0	3.0/0.0	4.0/0.0
Formation	2/0	4.0/0.0	4.0/0.0
External Loads	3/1	5.0/2.0	8.0/2.0
Combat Capable Check	1/1	1.5/1.0	3.0/2.0
TOTAL FOR PHASE	22/5	36.0/9.0	50.0/10.0
COMBINED TOTALS	27	45.0	60.0
ACCUMULATION BASIC/TRANSITION CREW CHIEF	27	45.0	60.0

2. Combat Ready Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>	<u>CRP</u>
<u>ACFT/SIM</u>			
<u>ACFT/SIM</u>			
Internal Loads	2/0	4.0/0.0	1.6/0.0
Confined Area Landings	3/0	6.0/0.0	2.4/0.0
Formation	3/0	5.5/0.0	2.4/0.0
Tilt-Rotor Low Altitude Tactics	4/0	6.0/0.0	2.6/0.0
Aerial Gunnery	2/0	3.0/0.0	1.6/0.0
External Loads	1/0	2.0/0.0	0.8/0.0
Tactics	2/0	5.0/0.0	2.0/0.0
Carrier Qualification	2/0	3.0/0.0	1.6/0.0
TOTAL FOR PHASE	19/0	34.5/0.0	15.0/0.0
COMBINED TOTALS	19	34.5	15.0
ACCUMULATION BASIC/TRANSITION CREW CHIEF	46	79.5	75.0

3. Combat Qualification Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>	<u>CRP</u>
<u>ACFT/SIM</u>			
<u>ACFT/SIM</u>			
Carrier Qualification	3/0	4.5/0.0	4.5/0.0
Night Systems	3/0	5.0/0.0	6.0/0.0
Defensive Measures	1/0	1.5/0.0	1.5/0.0
Tactics	2/0	6.0/0.0	4.0/0.0
Tilt-Rotor Insert/Extract Techniques	3/0	5.0/0.0	4.0/0.0
TOTAL FOR PHASE	12/0	22.0/0.0	20.0/0.0
COMBINED TOTALS	12	22.0	20.0
ACCUMULATION BASIC/TRANSITION CREW CHIEF	58	101.5	95.0

4. Full-Combat Qualification Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>	<u>CRP</u>
<u>ACFT/SIM</u>			
<u>ACFT/SIM</u>			
Air Combat Maneuvering	2/0	2.0/0.0	1.0/0.0
External Operations	1/0	2.0/0.0	1.0/0.0
Nuclear, Biological, Chemical	1/0	1.0/0.0	1.0/0.0
Tilt-Rotor Insert/Extract Techniques	2/0	3.0/0.0	1.0/0.0
Tactics	1/0	3.0/0.0	1.0/0.0
TOTAL FOR PHASE	7/0	11.0/0.0	5.0/0.0
COMBINED TOTAL	7	11.0	5.0
TOTAL FOR BASIC/TRANSITION CREW CHIEF	65	112.5	100.0

221. FLIGHT TRAINING FOR REFRESHER CREW CHIEF1. Combat Capable Phase

THIS PHASE NOT APPLICABLE TO CREW CHIEF

2. Combat Ready Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>
<u>ACFT/SIM</u>		
Internal Loads	1/0	2.0/0.0
Confined Area Landings	2/0	4.0/0.0
Formation	2/0	3.5/0.0
Tilt-Rotor Low Altitude Tactics	2/0	3.0/0.0
Aerial Gunnery	2/0	3.0/0.0
Externals	1/0	2.0/0.0
Tactics	1/0	3.0/0.0
TOTAL FOR PHASE	11/0	20.5/0.0
COMBINED TOTAL	11	20.5
ACCUMULATION FOR REFRESHER CREW CHIEF	11	20.5

3. Combat Qualification Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>
<u>ACFT/SIM</u>		
Carrier Qualification	3/0	4.5/0.0
Night Systems	3/0	5.0/0.0
Tactics	1/0	3.0/0.0
Tilt-Rotor Insert/Extract Techniques	2/0	4.0/0.0
TOTAL FOR PHASE	9/0	16.5/0.0
COMBINED TOTAL	9	16.5
ACCUMULATION FOR REFRESHER CREW CHIEF	20	37.0

4. Full-Combat Qualification Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>
<u>ACFT/SIM</u>		
Air Combat Maneuvers	2/0	2.0/0.0
Tactics	1/0	3.0/0.0
TOTAL FOR PHASE	3/0	5.0/0.0
COMBINED TOTAL	3	5.0
TOTAL FOR REFRESHER CREW CHIEF	23	42.0

222. FLIGHT TRAINING FOR CREW CHIEF INSTRUCTOR UNDER TRAINING

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>
<u>ACFT/SIM</u>		
Familiarization	1/0	1.5/0.0
Confined Area Landings	1/0	1.5/0.0
Formation	1/0	1.5/0.0
External Operations	1/0	1.5/0.0
Standardization Check	1/0	2.0/0.0
TOTAL FOR INSTRUCTOR CREW CHIEF	5/0	8.0/0.0

223. FLIGHT TRAINING FOR BASIC AND TRANSITION AERIAL OBSERVER (AO)

1. Combat Capable Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>	<u>CRP</u>
<u>ACFT/SIM</u>			
<u>ACFT/SIM</u>			
Familiarization	3/0	4.5/0.0	10.0/0.0
Internal Cargo Operations	3/0	5.5/0.0	9.0/0.0
Confined Area Landings	2/0	3.0/0.0	8.0/0.0
Tilt-Rotor Low Altitude Training	2/0	3.0/0.0	8.0/0.0
Formation	2/0	4.0/0.0	8.0/0.0
External Cargo Operations	3/0	5.0/0.0	12.0/0.0
Combat Capable Check	1/0	1.5/0.0	5.0/0.0
TOTAL FOR PHASE	16/0	26.5/0.0	60.0/0.0
COMBINED TOTAL	16	26.5	60.0
ACCUMULATION FOR BASIC/TRANSITION AO	16	26.5	60.0

2. Combat Ready Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>	<u>CRP</u>
<u>ACFT/SIM</u>			
<u>ACFT/SIM</u>			
Internal Cargo Operations	2/0	4.0/0.0	1.0/0.0
Confined Area Landings	3/0	6.0/0.0	3.0/0.0
Formation	3/0	5.5/0.0	3.0/0.0
Tilt-Rotor Low Altitude Training	2/0	3.0/0.0	2.0/0.0
Aerial Gunnery	2/0	3.0/0.0	2.0/0.0
Tactics	2/0	5.0/0.0	2.0/0.0
Carrier Qualification	2/0	3.0/0.0	2.0/0.0
TOTAL FOR PHASE	16/0	29.5/0.0	15.0/0.0
COMBINED TOTAL	16	29.5	15.0
ACCUMULATION FOR BASIC/TRANSITION AO	32	56.0	75.0

3. Combat Qualification Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>	<u>CRP</u>
<u>ACFT/SIM</u>			
<u>ACFT/SIM</u>			
Carrier Qualification	3/0	4.5/0.0	4.5/0.0
Night Systems	3/0	5.0/0.0	6.0/0.0
Defensive Maneuvers	1/0	1.5/0.0	1.5/0.0
Tactics	2/0	6.0/0.0	4.0/0.0
Tilt-Rotor Low Altitude Training	3/0	5.0/0.0	4.0/0.0
TOTAL FOR PHASE	12/0	22.0/0.0	20.0/0.0
COMBINED TOTAL	12	22.0	20.0
ACCUMULATION FOR BASIC/TRANSITION AO	44	78.0	95.0

4. Full-Combat Qualification Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>	<u>CRP</u>
<u>ACFT/SIM</u>			
Air Combat Maneuvers	2/0	2.0/0.0	2.0/0.0
External Cargo Operations	1/0	2.0/0.0	1.0/0.0
Nuclear, Biological, and Chemical	1/0	1.0/0.0	1.0/0.0
Tactics	1/0	3.0/0.0	1.0/0.0
TOTAL FOR PHASE	5/0	8.0/0.0	5.0/0.0
COMBINED TOTAL	5	8.0	5.0
TOTAL FOR BASIC/TRANSITION AO	49	86.0	100.0

224. FLIGHT TRAINING FOR REFRESHER AERIAL OBSERVER

1. Combat Capable Phase

NOT APPLICABLE

2. Combat Ready Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>
<u>ACFT/SIM</u>		
Internal Cargo Operations	1/0	2.0/0.0
Confined Area Landings	2/0	4.0/0.0
Formation	2/0	3.5/0.0
Tilt-Rotor Low Altitude Tactics	1/0	1.5/0.0
Aerial Gunnery	2/0	3.0/0.0
Tactics	1/0	3.0/0.0
Carrier Qualification	1/0	2.0/0.0
TOTAL FOR PHASE	10/0	19.0/0.0
COMBINED TOTAL	10	19.0
ACCUMULATION FOR REFRESHER AO	10	19.0

3. Combat Qualification Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>
<u>ACFT/SIM</u>		
Carrier Qualification	2/0	3.0/0.0
Night Systems	3/0	5.0/0.0
Defensive Maneuvers	1/0	1.5/0.0
Tactics	1/0	3.0/0.0
Tilt-Rotor Insert/Extract Techniques	1/0	2.0/0.0
TOTAL FOR PHASE	8/0	14.5/0.0
COMBINED TOTAL	8	14.5
ACCUMULATION FOR REFRESHER AO	18	33.5

4. Full-Combat Qualification Phase

<u>STAGE</u>	<u>EVENTS</u> <u>ACFT/SIM</u>	<u>HOURS</u>
<u>ACFT/SIM</u>		
Air Combat Maneuvers	2/0	2.0/0.0
Tactics	1/0	3.0/0.0
TOTAL FOR PHASE	3/0	5.0/0.0
COMBINED TOTAL	3	5.0
TOTAL FOR REFRESHER AO	21	38.5

225. FLIGHT TRAINING FOR REQUIREMENTS, QUALIFICATIONS, AND DESIGNATIONS

1. Requirement, Qualifications, and Designations

<u>STAGE</u>	<u>EVENTS</u>	<u>HOURS</u>
	<u>ACFT/SIM</u>	
Annual NATOPS Evaluation	1/0	1.5/0.0
TOTAL FOR RQD	1	1.5

230. SIMULATOR TRAINING. While it is recognized the simulator does not specifically train to the Crew Chief or Aerial Observer positions, the Full Flight Simulator (FFS) has been incorporated into the Combat Capable Phase of the syllabus to integrate the Crew Chief into cockpit procedures prior to entering the aircraft.

231. EVENT TRAINING NOMENCLATURE. Per T&R Manual Volume 1 the following nomenclatures are used to differentiate aircraft and simulator events. The aircraft is used for those events designated with an "A" and the flight simulator is used for those events designated with an "S" in the event header. To give commanding officers the maximum amount of flexibility for training some events allow for the optional use of simulators or aircraft. Those types of events will use the designator "A/S" for aircraft preferred, simulator optional and "S/A" for simulator preferred, aircraft optional.

240. FLIGHT/SIMULATOR PERFORMANCE REQUIREMENTS

1. Purpose. Become familiar with aircraft limitations, operating procedures, and emergency procedures; to demonstrate the ability to use all maintenance publications, knowledge of NATOPS, and safety regulations pertinent to flight operations and maintenance procedures. To develop and maintain the Crew Chief's tactical proficiency and knowledge.

2. General

a. This manual generalizes mission guidance to allow for local conditions and to allow this manual to remain unclassified. CMC (A) and CG MCCDC encourage squadrons to use the full range of tactics in the tactical manuals and adopt the latest developed and proven tactics.

b. Compliance with written event description is mandatory for syllabus event completion. In the absence of a flight simulator, completion of a syllabus event is not required to complete that stage. Completion of those events should be accomplished as soon as practicable upon simulator availability. Should the command desire, simulator events can be flown as aircraft flight events for T&R credit. ACT will be stressed and evaluated throughout each stage.

c. All flights shall terminate with a comprehensive debrief with emphasis on the aircrew's performance using all evaluation techniques.

d. Aircrews shall fly events annotated with an "N" or "NS" at least 30 minutes after official sunset. Aircrews may fly events annotated with an "(N)" at night.

e. Aircrewmembers shall fly events annotated with an "NS" with night vision devices. Events annotated with "(N)" are night optional. Events annotated with "(NS)" may be flown in the day or using NVDs at night. Minimum crew includes a qualified Aerial Observer for all events annotated with an "NS."

f. A Crew Chief Under Instruction (CCUI) shall complete the appropriate FREST ground school instruction prior to commencement of flight training.

g. All flights annotated with an "E" shall be evaluated per T&R Manual, Volume 1, Chapter 4, Paragraph 4004.

3. Syllabus Assignment

a. Basic and Transition Crew Chiefs/Aerial Observers will be assigned to fly the entire syllabus. Refreshers and Modified Refreshers will fly the flights designated by a "R" or "M" respectively in the flight description.

b. Refresher Syllabus. The refresher syllabus is predicated on the experience of the refresher Crew Chief/Aerial Observer. A Crew Chief/Aerial Observer in the refresher syllabus should fly all "R" coded events. However, a refresher Crew Chief/Aerial Observer need not fly every event within a stage of training to be requalified in that stage. The unit commanding officer may tailor the refresher syllabus to fit the experience of the refresher Crew Chief/Aerial Observer per T&R Manual, Volume 1. When the "R" coded events within a stage of training are complete, the Crew Chief/Aerial Observer may be credited with the CRP for the entire stage of training. This assumes that the refresher has had previous proficiency in that stage of training. If the refresher Crew Chief/Aerial Observer has no previous proficiency in a stage or particular event, then the refresher should fly the entire stage or all events not previously flown.

(1) A modified refresher syllabus for personnel out of the cockpit for 16-24 months can be individually tailored as specified by the commanding officer of the FRS, however, in no case will this syllabus be less than the minimum modified refresher syllabus shown here. The refresher's syllabus will be established by the tactical squadron. It will be based upon the refresher syllabus but may be modified by the squadron commanding officer.

(2) The refresher syllabus applies only up to the stage achieved during the prior tour, after that the Crew Chief/Aerial Observer will complete the entire remaining syllabus.

4. Aircrew Evaluation Flights. All Crew Chiefs and Aerial Observers shall have a NATOPS evaluation form filled out annually upon completion of the following:

a. Annual NATOPS Check (CCX-192, RQD-600). A designated NATOPS instructor/assistant shall evaluate CCX-192, RQD-600.

b. Initial flights not requiring an instructor. A Crew Chief who is proficient in that sortie shall evaluate and write an Aircrew Evaluation Form.

5. Aircrew Training Forms (ATFs)

a. An ATF is required for initial events completed by a Basic, Transition, Refresher aircrewman or as recommended by the squadron Standardization Board.

b. If the commanding officer has waived a syllabus sortie, the squadron training officer shall place a waiver letter in section 3 of the APR.

6. Instructor Requirements

a. For Combat Capable flight events, the minimum instructor requirement is an FRS Crew Chief Instructor. A Crew Chief Instructor, once certified by the FRS Commanding Officer, may instruct any day and night unaided Combat Capable flight event. The FRS CCI will be certified in accordance with the syllabus contained in paragraph 250 of this chapter. To instruct NVD events the CCI must be designated a Crew Chief Night Systems Familiarization Instructor (CCNSFI) by the FRS Commanding Officer or a designated Crew Chief Night Systems Instructor (CCNSI). The CCNSFI and CCNSI requirements are contained in the MAWTS-1 Course Catalog.

b. The type of squadron CCI required for Combat Ready, Combat Qualification, and Full-Combat Qualification is contained in the right margin of the event header. If the event header contains no instructor requirement, then the minimum requirement is a Tilt-rotor Crew Chief proficient and current in the event to be instructed.

7. Event Completion. Compliance with the written event description is mandatory for syllabus event completion. Times indicated for each event are only recommendations.

8. Weight and Balance. Weight and balance sheets will be completed per NATOPS guidelines and Standing Operating Procedures.

9. Crew Requirements/Position Designations. Crew requirements are listed for each stage of training.

10. Sequence. Training should be accomplished by flying events within a stage in sequence and stages in sequence when practical.

11. Definitions

a. Discuss

(1) The CCI shall discuss a procedure or maneuver during the brief, in flight, or debrief.

(2) The CCUI is responsible for knowledge of the applicable procedures prior to the briefing.

b. Demonstrate

(1) The CCI performs the maneuver with accompanying description.

(2) The CCUI observes the maneuver and is responsible for the knowledge of the procedures prior to the flight.

c. Introduce

(1) At his option, the CCI may perform the maneuver with an accompanying description, or he may coach the CCUI through the maneuver without demonstration.

(2) The CCUI shall perform the maneuver with coaching as necessary and is responsible for knowledge of the procedures prior to the flight.

d. Review

(1) The CCI observes and grades the maneuver without coaching the CCUI. An airborne critique of the CCUIs performance is at the option of the instructor.

(2) The CCUI is expected to perform the maneuver without coaching and devoid of procedural error at a level acceptable to warrant progress into the next stage of training.

12. Aircrew Coordination. Aircrews shall brief techniques of aircrew coordination for all flights and/or events. The Crew Chief will act as an observer, always being alert for other aircraft or obstacles to flight. He will supervise internal loading at the direction of the Crew Chief/Aerial Observer, verbally direct the Crew Chief/Aerial Observer during external hookups and releases, and supervise the embarkation and debarkation of passengers. The Crew Chief may detect system failures before the Crew Chief/Aerial Observer and must inform him of potential malfunctions. He can affect minor airborne repairs and supervise any additional crew members that the mission may require.

13. Operational Risk Management. Aircrews will brief those factors that affect risk mitigation decisions for every flight or mission.

241. COMBAT CAPABLE PHASE1. Familiarization (FAM)

a. Purpose. To develop a combat capable Crew Chief and Aerial Observer. At the completion of this phase the Crew Chief will be NATOPS qualified and rate the 6175 MOS.

b. General

(1) Aircrews may fly these flights in conjunction with the pilot syllabus. The aircrewman should complete all familiarization stage flights prior to flying any subsequent flights.

(2) The CCI shall be a designated CCNSFI or CCNSI for FAM-122.

c. Crew requirements. CCI/CCUI or CCI/AOUI. AOUI flies FAM-111, FAM-120, FAM-122.

d. Prerequisite. Aircrews must complete their physical, Naval Aviation Water Survival Training Program (NAWSTP), Naval Aviation Physiology Training Program (NAPTP) prior to beginning flight training. Aircraft Weight and Balance instruction shall be completed prior to FAM-111. NITE lab completed prior to any flights using NVDs.

e. Ground Training

(1) Publications and related directives.

(2) Safety.

(3) Ground handling.

(4) Aircrew Coordination Training.

(5) Night Imaging and Threat Evaluation (NITE) Lab Instruction.

(6) Fueling and servicing.

(7) Aircraft weight/balance during cargo loading, and equipment storage.

(8) Maintenance procedures and troubleshooting.

f. Simulator Training. (1 Event, 2.0 Hours).

g. Flight Training. (7 Flights, 10.5 Hours).

SFAM-100

2.0

S(FFS)

SIMI or IP

Goal. Introduce the aircrewman to FAM procedures using the MV-22 FFS.

Requirement. Crew Chief will attend pilot's brief and debrief.

FAM-111

1.5

A(MV-22)

CCI

Goal. Introduce CCUI to Crew Chief duties, and Conversion flight mode. Introduce battery operations, APU start up, CMS power up, start-up/shutdown, communication procedures, aircraft weight and balance, ground operations, emergency procedures, and low work.

Requirement

(1) Discuss

- (a) Nacelle/IR suppresser fire on the ground.
- (b) APP fire.
- (c) Fuselage fire.
- (d) Electrical fire.
- (e) Engine post shutdown fire.
- (f) Fire fighting equipment operation.
- (g) Hand and arm signals for fires.

(2) Demonstrate. Systems knowledge, systems troubleshooting.

(3) Introduce

- (a) Preflight.
- (b) Battery operations.
- (c) APU start.
- (d) CMS power up.
- (e) PF-BIT.
- (f) Start-up/shutdown procedures.
- (g) Taxing directions.
- (h) Lookout doctrine.
- (i) Aircraft servicing.
- (j) Postflight.
- (k) Turnaround inspection.
- (l) VSLED.
- (m) Emergency egress procedures.
- (n) Instruct the aircrewman in the use of the appropriate aircrew pocket checklist.

- (o) Aircrew coordination.
- (p) Internal/External communications procedures.
- (4) CCUI observe and assist the Crew Chief Instructor as required.

Prerequisite. SFAM-100.

FAM-112

1.5

A(MV-22)

CCI

Goal. Introduce CCUI to conversion mode maneuvers and blade fold wing stow. Review preflight, CMS power up/functions start-up/shutdown, ground operations, and emergency procedures.

Requirement

(1) Discuss

- (a) Use of ICS.
- (b) Common terminology.
- (c) Voice procedures.
- (d) Ramp operation.
- (e) Emergency procedures.
- (f) Flotation and inflation procedures.
- (g) Ditching/abandoning aircraft.
- (h) Search and rescue scanning and sighting techniques.
- (i) Aircraft systems status.
- (j) Utility hoist operation.
- (k) Hydraulic systems emergencies.

(2) Introduce

- (a) Conversion mode maneuvers.
- (b) Blade fold wing stow.
- (c) Systems troubleshooting and system function checks.

(3) Review

- (a) Preflight.
- (b) Daily inspection.
- (c) Battery operations.

- (d) APU start.
- (e) CMS power up/functions.
- (f) PF-BIT.
- (g) VSLED.
- (h) Start-up/Shutdown.
- (i) Taxi directions.
- (j) Lookout doctrine.
- (k) Servicing.
- (l) Postflight.
- (m) Turnaround inspection procedures.
- (4) CCUI act in the capacity of Crew Chief under the supervision of a designated Crew Chief Instructor.

Prerequisite. FAM-111.

FAM-113

1.5

A(MV-22)

CCI

Goal. Introduce the CCUI to forward flight in airplane mode.

Requirement

(1) Discuss

- (a) Cabin preparation for airplane mode.
- (b) Aircrew Coordination. Crew Chief cockpit situational awareness and aircraft systems status.

(2) Introduce

- (a) Cabin preparation for airplane mode.
- (b) The use of the cockpit jumpseat during airplane mode.

(3) Review. Emergency procedures for engine fire in-flight, fuselage fire, electrical fire, engine post shutdown fire, smoke and fume elimination.

(4) Evaluate

- (a) Preflight.
- (b) Starting.
- (c) Taxing directions.
- (d) Lookout doctrine.

- (e) Servicing.
- (f) Postflight.
- (g) Turnaround inspection.
- (h) Emergency egress procedures.

(5) CCUI act in the capacity of Crew Chief under the supervision of a designated Crew Chief Instructor.

FAM-116 2.0 A(MV-22) CCI

Goal. Review FAM stage maneuvers and procedures.

Requirement

- (1) Review FAM stage procedure and maneuvers.
- (2) CCUI act in the capacity of the Crew Chief.

FAM-118 1.5 A(MV-22) CCI

Goal. FAM stage progress check.

Requirement. Evaluate all procedures and maneuvers previously introduced.

FAM-120 1.5 A(MV-22) N CCI

Goal. Introduce night unaided operations.

Requirement

- (1) Discuss
 - (a) Crew day/crew rest.
 - (b) MV-22 lighting systems (internal and external).
 - (c) Night vision techniques as contained in MV-22 TAC Manual.
 - (d) Airfield lighting.
 - (e) Aircrew coordination.
- (2) Demonstrate. Use of cabin lighting and emergency exit lights (EELS).
- (3) Introduce
 - (a) Preflight at night.
 - (b) Starting.
 - (c) Taxi.

- (d) Lookout.
- (e) Shutdown.
- (f) Postflight procedures.

(4) Review. Crew chief duties during precautionary/emergency landings, with emphasis on night operations.

(5) CCUI will observe and assist the Crew Chief Instructor as required.

Prerequisite. FAM-118.

FAM-122

1.5 A(MV-22) N NS

CCNSFI

Goal. Introduce aircrewman to HLL NVG FAM operations.

Requirement

(1) Discuss

- (a) Night Vision Goggles.
- (b) NVG briefing guide.
- (c) Aircrew coordination as contained in MV-22 TAC Manual.
- (d) Crew comfort levels and safety precautions.

(2) Introduce

- (a) NVGs at an outlying airfield with .0022 LUX or greater illumination.
- (b) NVG scan.
- (c) Obstacle clearance.
- (d) Approach to landing procedures.

(3) Review

- (a) Preflight at night.
- (b) Starting.
- (c) Taxi.
- (d) Lookout.
- (e) Shutdown.
- (f) Postflight procedures.

Prerequisite. Night Imaging and Threat Evaluation (NITE) Lab and MAWTS-1 Enlisted Aircrew Academic Support Package "Aircrew Night Vision Training Course."

2. Internal Loads (INT)

a. Purpose. Introduce Crew Chief duties in loading, securing, unloading passengers, cargo and vehicles.

b. General

(1) Aircrew may fly these flights in conjunction with any stage of the pilot syllabus.

(2) The CCI shall be designated CCNSFI or CCNSI if NVGs are used.

c. Crew Requirement. CCI/CCUI.

d. Academics. Study the A1-V22-AB-CLG-000 (Cargo Loading Manual), NATOPS Flight Manual, and Aircraft Loading and Equipment Storage.

e. Ground Training. (2 Events, 4.0 Hours).

f. Flight Training. (1 Flight, 1.5 Hours).

INT-130 2.0(Static) A(Static MV-22) CCI

Goal. Introduce the Crew Chief duties for internal cargo and/or vehicles.

Requirement(1) Discuss

(a) Aircraft weight and balance.

(b) Tie down procedures.

(c) Safety regulations for loading and unloading cargo and vehicles.

(d) Ditching procedures.

(2) Demonstrate

(a) The use of the cargo winch.

(b) Emergency passenger egress procedures and abandon/ditching aircraft procedures.

(3) Introduce. Flight/safety equipment for passengers, combat troops, and litter patients over both land and water.

(4) Review. Ramp operation.

(5) CCUI observer and assist the Crew Chief Instructor as required.

INT-131 2.0(Static) A(Static MV-22) CCI

Goal. Introduce the Crew Chief duties for passengers, troops and CASEVAC procedures.

Requirement(1) Discuss

- (a) Safety regulations and required flight/safety equipment for passengers, combat troops and litter patients over both land and water.
- (b) Passenger briefing, embarking, securing and debarking procedures.
- (c) Ditching procedures.
- (d) MEDEVAC/CASEVAC mission categories and precedence.

(2) Introduce

- (a) Aircraft weight and balance.
- (b) Proper litter attachment and securing.
- (c) Passenger briefing, embarking, securing and debarking procedures.

(3) Review. Emergency passenger egress procedures and abandon/ditching aircraft procedures.

(4) CCUI act in the capacity of Crew Chief under the supervision of a designated Crew Chief Instructor.

INT-135 1.5 A(MV-22) (N) (NS) CCI (CCNSFI)

Goal. Review Crew Chief duties during internal operations.

Requirement

- (1) Review. Previously introduced procedures as appropriate, perform aircraft weight and balance.
- (2) CCUI act in the capacity of Crew Chief under the supervision of a designated Crew Chief Instructor.
- (3) If NVGs used CCI shall be an CCNSFI or CCNSI.

3. Confined Area Landings (CALS)

a. Purpose. Introduce aircrew to duties when landing in confined areas.

b. General

(1) Aircrews may fly this stage in conjunction with the CAL stage in the Pilots syllabus.

(2) The CCI shall be a designated CCNSFI or CCNSI for CAL-143.

c. Crew Requirement. CCI/CCUI or CCI/AOUI. AOUI flies CAL-141 and CAL-143.

d. Academics

(1) Survival and First Aid.

(2) Communications Procedures.

e. Simulator Training. (1 Event, 2.0 Hours).

f. Flight Training. (3 Flights, 4.5 Hours).

SCAL-140 2.0 S (FFS) SIMI or IP

Goal. Introduce cockpit procedures during confined area landings.

Requirement. Crew Chief will attend pilots brief and debrief.

(1) Discuss

(a) Common terminology during CALs.

(b) Lookout doctrine.

(c) Aircrew coordination.

(d) Aircraft/nacelle clearance.

(e) Uneven/sloped terrain.

(f) Obstacle clearance.

(g) LZ suitability.

(2) Demonstrate

(a) Various types of confined area sites.

(b) Site evaluation.

(c) Landing patterns and various approaches.

(d) Communication procedures.

CAL-141 1.5 A (MV-22) CCI

Goal. Introduce Confined Area Landing Procedures.

Requirement

(1) Discuss

(a) Mountain and rough terrain flying and aircrew coordination.

(b) Common terminology during CALs.

(c) Lookout doctrine.

- (d) Aircraft/nacelle clearance.
- (e) Uneven/sloped terrain.
- (f) Obstacle clearance.
- (g) LZ suitability.

(2) Introduce

- (a) Lookout doctrine.
- (b) Aircrew coordination.
- (c) Waveoff procedures.
- (d) Rotor, nacelle, and aircraft fuselage clearances.
- (e) Emphasize obstacle clearance during approach, landing, and takeoff, suitability of LZ terrain, and drift correction call to the pilot prior to aircraft touchdown.

CAL-142 1.5 A (MV-22) CCI

Goal. Review of CAL procedures.

Requirement

(1) Discuss

- (a) Lookout doctrine.
- (b) Landing system failures.
- (c) Vibrations.
- (d) Engine failures in flight.

(2) Review. Items introduced on CAL-141.

CAL-143 1.5 A (MV-22) N NS CCNSFI

Goal. Introduce confined area landings at night utilizing NVGs.

Requirement

(1) Discuss

- (a) Night adaptation.
- (b) Protection of night vision.
- (c) Aircraft preparation.
- (d) LZ lighting as contained in the MV-22 TAC Manual.

(2) Introduce

(a) Procedures for lookout doctrine.

(b) Aircrew coordination required during confined area landings at night.

(c) Emphasize obstacle identification.

(3) CCUI act in the capacity of Crew Chief under the supervision of a designated Crew Chief Instructor.

Prerequisites. FAM-122 AND CAL-141.

4. Navigation (NAV)a. Purpose. Introduce the CCUI to flight operations terminating at other than home field and identify positions using charts and maps.b. Ground Training. NAV stage lecture and/or Interactive Course Ware.c. Crew Requirement. CCI/CCUI.d. Simulator Training. (1 Event, 2.0 Hours).e. Flight Training. (1 Flight, 1.5 Hours).SNAV-1502.0S (FFS)SIMI or IPGoal. Introduce flight navigation, map reading skills, terrain recognition/identification.Requirement. Crew Chief will attend pilot's brief and debrief.(1) Discuss

(a) Landmark identification.

(b) Prominent terrain features.

(c) Crew communication for relaying information.

(2) Introduce

(a) Landmark identification.

(b) Identifying prominent terrain features.

(c) Crew communication for relaying information.

NAV-151 1.5 A(MV-22) (N)(NS) CCI(CCNSFI)

Goal. Introduce flight navigation.

Requirement

(1) Discuss

- (a) Assisting the pilot in navigating.
- (b) Be familiar with CMS/moving map features.
- (c) Stress landmark identification and prominent terrain features.
- (d) Lookout doctrine.
- (e) Crew communication for relaying information.

(2) Introduce

- (a) Landmark identification.
- (b) Identifying prominent terrain features.
- (c) Crew communication for relaying information.

5. Tilt-Rotor Low Altitude Training (VLAT)

a. Purpose. To develop proficiency in VLAT maneuvers with emphasis on the importance of crew coordination, comfort level, and common terminology.

b. General

(1) A CCVLATI is required for all initial VLAT instructional events. The prerequisite academic lectures that support the VLAT stages are contained in the MAWTS-1 Academic Support Package, except MITAC which is self-contained. The academic training shall be completed prior to commencing the VLAT stage of training.

(2) Maneuver descriptions may be found in the MV-22 TAC Manual, and explained in the current MAWTS-1 Helicopter Academic Support Package.

(3) Currency and altitudes are established and listed in MCO P3500.14_.

(4) The entire flight crew shall brief together for each flight.

c. Crew Requirement. CCI/CCUI or CCI/AOUI.

d. Prerequisite. All aircrewmembers receiving the academic and flight VLAT training shall have a secret clearance.

e. Ground Training

(1) VLAT course listed in the MAWTS-1 Course Catalog.

(2) Familiarity with Chapter 15, MV-22 TAC Manual.

f. Flight Training. (2 flights, 3.0 hours).

VLAT-162 1.5 A (MV-22) CCVLATI

Goal. Introduce VLAT maneuvers in airplane mode.

Requirement

(1) Discuss

- (a) VLAT altitude/airspeed restrictions.
- (b) Crew comfort level.
- (c) Aircrew communications/coordination during VLAT flight.

(2) Introduce

- (a) Performance checks.
- (b) Masking/unmasking.
- (c) VLAT turns.
- (d) Bunt.
- (e) Roll.
- (f) Low level and contour profiles.

(3) CCUI assist the Crew Chief Instructor for the initial 0.5 hour of the flight, then for the remainder of the flight act in the capacity of Crew Chief under the supervision of a CCVLATI.

Prerequisite. CAL-141. Academic lectures that support VLAT stages.

VLAT-163 1.5 A (MV-22) CCVLATI

Goal. Introduce VLAT maneuvers in conversion mode.

Requirement

(1) Discuss

- (a) VLAT maneuvers.
- (b) Aircraft clearances.
- (c) Aircrew communications and coordination during maneuvers.

(2) Introduce

- (a) Bunts.

- (b) Rolls.
- (c) Quick stops.
- (d) Performance checks.
- (e) Blade walk around.

(3) CCUI assist the Crew Chief Instructor for the initial 0.5 hour of the flight, then for the remainder of the flight act in the capacity of Crew Chief under the supervision of a designated Crew Chief Instructor.

Prerequisites. CAL-141.

6. Formation (FORM)

a. Purpose. Familiarize the aircrew with responsibilities during formation flight that will enhance aircrew coordination.

b. General

(1) Aircrews may fly this stage in conjunction with the formation stage of the pilot syllabus.

(2) CCI shall be a designated CCNSFI or CCNSI if NVGs are used.

c. Crew Requirements. CCI/CCUI or CCI/AOUI.

d. Flight Training. (2 Flights, 4.0 Hours).

FORM-172 2.0 A(2 MV-22) CCI

Goal. Introduce formation flight.

Requirement

(1) Discuss

- (a) Parade and cruise formations.
- (b) Closure rate.
- (c) Hand and arm signals.

(2) Introduce

- (a) Formation lookout doctrine.
- (b) Responsibilities as lead and wingman.

(3) CCUI observe and assist the Crew Chief Instructor for the initial 0.5 hour of the flight, then for the remainder of the flight act in the capacity of Crew Chief under the supervision of a designated Crew Chief Instructor.

FORM-174

2.0

A(2 MV-22) N NS

CCNSFI

Goal. Introduce formation flight utilizing NVGs.

Requirement

(1) Discuss

- (a) Closure rate.
- (b) Scan techniques.
- (c) Aircraft lighting.
- (d) Light signals.
- (e) Lookout responsibilities.
- (f) Discuss inter- and intra-cockpit communications/coordination during section emergencies.

(2) Introduce. Responsibilities during formation flying at night.

(3) Review

- (a) Parade and cruise formation.
- (b) Responsibilities as lead and wingman.
- (4) CCUI assist the Crew Chief Instructor for the initial 0.5 hour of the flight, then for the remainder of the flight act in the capacity of Crew Chief under the supervision of a designated Crew Chief Instructor.

Prerequisite. FAM-122 and FORM-172.

7. External Loads (EXT)

a. Purpose. To develop the skills necessary to conduct external cargo operations utilizing all cargo release modes. Conduct single point and dual point hookups and deliveries.

b. General

(1) Aircrew may fly this stage in conjunction with the external stage of the pilot syllabus.

(2) The CCI shall be a designated CCNSFI or CCNSI if NVGs are used.

c. Crew Requirements. CCI/CCUI or CCI/AOUI.

d. Ground Training. Consult FMFRP 5-31 VOL. I-iii (Basic Operation/Equipment, and Single and Dual Point Hook Procedures) and FMFRP 5-31, Vol 1, Multi-Service Helicopter External Air Transport Manual.

e. External Syllabus Support. HST.

f. Simulator Training. (1 Event, 2.0 Hours).

g. Flight Training. (3 Flights, 5.0 Hours).

SEXT-180

2.0

S (FFS)

SIMI or IP

Goal. Introduce external load operation procedures.

Requirement. Crew Chief will attend pilot's brief and debrief.

(1) Discuss

- (a) Cargo hooks.
- (b) Cargo hook control panel.
- (c) Aircrewman's portable pendant control.
- (d) Cargo hook emergency release handle.
- (e) Static discharge precautions.
- (f) Load rigging.

(2) Introduce

- (a) Standardized voice commands.
- (b) Loss of communications procedures.

(3) Emergencies

- (a) In-flight cargo jettison criteria and procedures.
- (b) Inadvertent IMC with external loads.
- (c) emergency procedures with external loads.
- (d) Loss of ICS.

EXT-182

1.5

A (MV-22)

CCI

Goal. Introduce single point external loads.

Requirement

(1) Discuss

- (a) The cargo hook.
- (b) Cargo hook control panel.
- (c) Aircrewman's portable pendant control.
- (d) Cargo hook emergency release handle.
- (e) Static discharge precautions.

- (f) Load rigging.
- (2) Demonstrate. Hand and arm signals.
- (3) Review
 - (a) Standardized voice commands.
 - (b) Loss of communications procedures.
 - (c) Stress aircrew coordination.
- (4) CCUI assist the Crew Chief Instructor for the initial 0.5 hour of the flight, then for the remainder of the flight act in the capacity of Crew Chief under the supervision of a designated Crew Chief Instructor. Perform a minimum of five hookups.
- (5) Emergencies. Discuss in-flight cargo jettison criteria and procedures.

Prerequisite. A thorough brief shall be conducted between aircrew and ground crew personnel prior to commencing external cargo operations. In lieu of a brief, a letter of agreement may be utilized between the FRS and supporting unit.

EXT-183

2.0

A (MV-22)

CCI

Goal. Introduce dual point external loads.

Requirement

- (1) Discuss
 - (a) Safety precautions.
 - (b) Use hover light.
 - (c) External cargo lighting patterns.
 - (d) Stress aircrew coordination.
- (2) Demonstrate. Use of the hover light.
- (3) Perform a minimum of 5 hookups and releases.

Prerequisite. EXT-182. A thorough brief shall be conducted between aircrew and ground crew personnel prior to commencing external cargo operations. In lieu of a brief, a letter of agreement may be utilized between the FRS and supporting unit.

EXT-184

1.5

A (MV-22) N NS

CCNSFI

Goal. Introduce single point external operations utilizing NVGs.

Requirement

(1) Discuss

- (a) NVG scan over the load.
- (b) Use of hover light.
- (c) External cargo lighting patterns.
- (d) Different types of slings.
- (e) In-flight characteristics of odd size and aerodynamically unstable loads.
- (f) Safety precautions.

(2) Introduce. Aircrew coordination for NVG single point external load hookup and release procedures.

(3) Review

- (a) Preflight of single point system.
- (b) Lookout doctrine.
- (c) Proper voice procedures.
- (d) Static discharge precautions.
- (e) Perform a minimum of five hookup and release procedures.

(4) CCUI assist the Crew Chief Instructor for the initial 0.5 hour of the flight, then for the remainder of the flight act in the capacity of Crew Chief under the supervision of a designated Crew Chief Instructor.

Prerequisite. EXT-182. A thorough brief shall be conducted between aircrew and ground crew personnel prior to commencing external cargo operations. In lieu of a brief, a letter of agreement may be utilized between the FRS and supporting unit.

8. Combat Capable Check (REV & CCX)

a. Purpose. The CCUI should show proficiency in performing the duties as a combat capable Crew Chief or Aerial Observer per criteria contained in the appropriate MV-22 NATOPS Flight Manual and OPNAVINST 3710.7.

b. General

(1) A qualified NATOPS Crew Chief Instructor shall evaluate this flight.

(2) The CCUI or AOUI shall complete a MV-22 NATOPS Flight Manual open and closed book test prior to the combat capable check ride. Upon successful completion of CCX-193, the student will be NATOPS qualified as a Crew Chief or Aerial Observer and will be designated as such.

- c. Crew Requirement. CCI/CCUI or CCI/AQUI.
- d. Simulator Training. (1 Event, 1.0 Hour).
- e. Flight Training. (1 Flight, 1.5 Hours).

SREV-190 1.0 E S (FFS) (IP/CCI)

Goal. Review emergency procedures.

Requirement. Crew Chief will attend pilot's brief and debrief. Verbally respond to emergencies given to CCUI during period of instruction.

CCX-193	1.5	E	A (MV-22)	(N) (NS)	CC NATOPS Evaluator
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Goal. Evaluate systems knowledge of the MV-22 and the capability to perform duties as a combat capable Crew Chief or Aerial Observer. To certify the CCUI as a Tilt-rotor Crew Chief.

Requirement

- (1) Brief and show proficiency of aircraft emergency procedures per the MV-22 NATOPS Flight Manual.
- (2) Evaluate systems knowledge of the MV-22 to include external lift systems.
- (3) If NVGs are used, CC NATOPS Evaluator shall be an CCNSFI or CCNSI.

Prerequisite. SREV-190.

242. COMBAT READY PHASE

1. General

a. This phase of instruction introduces the Crew Chief and Aerial Observer to core skills.

b. Rules of conduct will be per T&R Manual, Volume 1.

c. Aircrewman shall fly all Night Systems events in this phase under ambient light conditions of .0022 LUX or greater.

d. An aircrewman under instruction is NSQ HLL at the completion of the following flights: CAL-214, EXT-222, FORM-232, and TAC-252. The above listed events require a CCNSI for all initial instructional events.

e. Aircrewman undergoing instruction in this phase must have completed the MAWTS-1 Course Catalog Academic Support Package lectures prior to beginning the applicable stage of training.

2. Internal Loads

(a) Purpose. Refine Crew Chief duties in loading, securing, unloading passengers, cargo, and vehicles.

(b) General

(1) Aircrew may fly these flights in conjunction with any stage of the pilot syllabus.

(2) The CCI shall be designated CCNSFI or CCNSI if NVGs are used.

(c) Crew Requirement. CCI/CCUI.

(d) Flight Training. (2 Flights, 4.0 Hours).

INT-200 2.0 A(MV-22) (N)

Goal. Aircraft weight and balance computations, tie down procedures, and safety regulations for loading and unloading cargo and tactical vehicles.

Requirement(1) Discuss

(a) Aircraft weight and balance.

(b) CG limitations.

(c) Procedures and safety precautions for transporting passengers, internal cargo, and/or tactical vehicles.

(d) Passenger briefing guide.

(e) Safety precautions in transporting passengers over land and water.

(2) Review

- (a) Cargo and vehicle loading.
- (b) Proper tie down procedures.
- (c) Use of cargo strap attenuators.
- (d) Aircraft weight and balance.
- (e) CG limitations.
- (f) Procedures and safety precautions for transporting passengers, internal cargo, and/or tactical vehicles.
- (g) Passenger briefing guide.
- (h) Safety precautions in transporting passengers over land and water.

INT-201

2.0

R A(MV-22) (N)

Goal. Introduce utilization of MV-22 range extension/self- deployment internal fuel tanks.

Requirement(1) Introduce

- (a) Proper loading.
- (b) Installation, securing, ops checking, removal, and storage of MV-22 range extension/self-deployment internal fuel tanks.

(2) Emergencies

- (a) Fuel dump/jettison.
- (b) Internal fuel tank system troubleshooting.
- (c) FMU failures/troubleshooting.

3. Confined Area Landings (CAL)

a. Purpose. Introduce CALs with multiple aircraft during both day and night.

b. General

(1) Aircrew may fly this stage in conjunction with the CAL stage in the Pilots syllabus.

(2) Read paragraph 242 (COMBAT READY PHASE).

(3) A designated CCNSI is required on initial CAL-214.

c. Crew Requirement. CC, CCI/CCUI or CCI/AOUI. AO flies CAL-211, CAL-212, and CAL-214. AO required for CAL-212 and 214 if not an instructional flight.

d. Flight Training. (3 Flights, 6.0 Hours).

CAL-211

2.0

A(MV-22)

Goal. Introduce and practice CALs using tactical approaches.

Requirement

(1) Brief/Discuss

(a) Aircrew coordination.

(b) Obstacle clearances.

(c) Landing with reduced visibility (i.e., sand, dust, snow, etc.).

(2) Introduce. Single aircraft CAL tactical approaches, and departures.

CAL-212

2.0

R A(MV-22)

Goal. Introduce CALs in mountainous terrain.

Requirement

(1) Discuss

(a) Crew chief responsibilities in mountainous terrain flight.

(b) High altitude physiology emergencies.

(c) Wind and weather effects.

(d) High altitude operations.

(e) Slope landings.

(f) Pinnacle landings.

(2) Introduce

(a) Mountainous area operations.

(b) Pinnacle landings.

(c) Slope landings.

(d) Crosswind landings.

(e) Landings and operations in valleys and canyons.

(3) Review. CAL-211.

Prerequisite. CAL-211.

CAL-214 2.0 R A(MV-22) N NS CCNSI

Goal. Introduce and practice NVG CALs.

Requirement

(1) Discuss

- (a) Depth perception.
- (b) Drift corrections.
- (c) Possible reduced visibility.
- (d) Obstacle clearance.
- (e) NVG failures.

(2) Introduce. Single aircraft CALs in HLL.

(3) Review. CAL-211.

Prerequisite. CAL-211. For initial flights designated NSI Crew Chief required. Aerial observer required if not an instructional flight.

4. Formation (FORM)

a. Purpose. To review cruise and parade formation and introduce tactical formations and maneuvering and NVG CALs.

b. Crew Requirement. P/P/CC and AO for FORM-224.

c. Academic Training

(1) Review tactical formation flight per the MV-22 TAC Manual.

(2) MAWTS-1 Academic Support Package Lecture, Tactical Formation Maneuvering, shall be completed prior to FORM-221.

d. Flight Training. (3 Flights, 5.5 Hours).

FORM-221 2.0 A(2 MV-22)

Goal. Review formation and section CALs.

Requirement

(1) Discuss

- (a) Formations.
- (b) Closure rates.

- (c) Hand and arm signals.
 - (d) Lead changes (to include form lead/tactical lead).
 - (e) Aircrew coordination.
 - (f) Loss of visual contact with wingman comfort levels.
 - (g) Emergency procedures.
- (2) Introduce
- (a) Section formation maneuvering per the MV-22 TAC Manual.
 - (b) Inter/Intra-plane coordination.
 - (c) Combat spread and combat cruise.
- (3) Review
- (a) Section approaches and departures from various CAL sites.
 - (b) Section takeoffs/landings.
 - (c) Cruise principles, cross-overs, break-up and rendezvous, and lead changes.

FORM-222

1.5 R A(2 MV-22)

Goal. Introduce tactical formation maneuvering.

Requirement

- (1) Discuss
- (a) Aircrew coordination.
 - (b) Crew Comfort level.
 - (c) Tactical formation maneuvering.
 - (d) Center turns.
 - (e) In place turns.
 - (f) Cross turns.
 - (g) Dig/Pinch.
 - (h) TAC turns right/left.
 - (i) Cover position.
 - (j) Break turns.

(2) Introduce

- (a) Break turns, center turns, pinch/dig, TAC turns, in place turns, split turns, cross turns.
- (b) Combat spread and combat cruise.
- (c) Section approaches and departures from various CAL sites.

(3) Review

- (a) Section takeoffs/landings.
- (b) Cruise principles, cross-overs, break-up and rendezvous, and lead changes.

FORM-224

2.0

R A(2 MV-22) N NS

CCNSI

Goal. Conduct formation and introduce section CALs with NVGs in HLL.

Requirement(1) Discuss

- (a) Aircrew coordination during NVD formation operations.
- (b) NVG formation techniques.
- (c) Aircraft lighting during NVG formation.
- (d) Closure rate.
- (e) Loss of visual contact with wingman.
- (f) Comfort level.
- (g) Emergency procedures.

(2) Introduce

- (a) Section landings and takeoffs using NVGs.
- (b) Waveoffs.
- (c) NVG emergencies.

(3) Review

- (a) Intra/Interaircraft communications.
- (b) Aircrew coordination.
- (4) For initial flight, NSI Crew Chief required.

Prerequisite. CAL-214 and FORM-222.

5. Tilt-Rotor Low Altitude Tactics (VLAT)

a. Purpose. To develop aircrew responsibilities and lookout doctrine with VLAT maneuvers/navigation and introduce section maneuvering in the day and night environment.

b. General

(1) Currency requirements per MCO P3500.14.

(2) At the completion of this stage of training the CCUI is considered VLAT qualified and may be designated as such by the Squadron Commanding Officer.

(3) A CCVLATI is required for initial VLAT-231 and VLAT-233. A CCNSI is required for initial VLAT-235 and 236.

c. Crew Requirement. CC/AO, CC/CCUI or CC/AOUI.

d. Prerequisite. Consult the VLAT academic classes listed in the MAWTS-1 Course Catalog for recommended lecture the Academic Support Package applicable to this stage of flight.

e. Flight Training. (4 Flights, 6.0 Hours).

VLAT-231	1.5	A (MV-22)	CCVLATI
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Goal. Review maneuvers and aircraft/obstacle clearance and introduce low level and contour flight while flying in a VLAT environment.

Requirement

(1) Discuss

- (a) Aircrew coordination.
- (b) Crew comfort levels.
- (c) Lookout doctrine
- (d) ICS procedures.
- (e) Aircraft clearance.
- (f) Navigation techniques from the cabin.

(2) Introduce

- (a) Low level and contour flight.
- (b) Navigation along a route.

(3) Review

- (a) VLAT Maneuvers.
- (b) Obstacle clearance.

VLAT-2331.5R A(2 MV-22)CCVLATI

Goal. Review VLAT maneuvers and aircraft clearances while conducting section flying in the VLAT environment.

Requirement

(1) Discuss

- (a) Crew comfort levels.
- (b) Aircrew coordination.
- (c) Lookout doctrine.
- (d) Terminology.
- (e) ICS procedures.
- (f) Aircraft clearance.

(2) Introduce

- (a) ICS procedures for VLAT section.
- (b) Lookout doctrine in VLAT section.
- (c) Aircrew coordination for section VLAT.

(3) Review. VLAT-231

Prerequisite. VLAT-231

LAT-2351.5A(MV-22) N NSCCNSI

Goal. Review aircraft maneuver performance and characteristics in the VLAT environment utilizing NVDs.

Requirement

(1) Discuss

- (a) Aircrew coordination.
- (b) Crew comfort levels.
- (c) Lookout doctrine at night.
- (d) ICS procedures.
- (e) Aircraft clearance at night.
- (f) Navigation techniques from the cabin.

(2) Review

- (a) VLAT performance checks.

(b) Low level flight/Contour profiles in both airplane and conversion modes.

(c) Bunt.

(d) Roll.

Prerequisite. VLAT-233

VLAT-236 1.5 R A(2 MV-22) N NS CCNSI

Goal. Review section VLAT navigation flight using NVGs.

Requirement

(1) Discuss

(a) Aircrew coordination peculiar to VLAT using NVGs.

(b) Crew comfort levels.

(c) Lookout doctrine on NVGs.

(d) ICS procedures.

(e) Aircraft clearance.

(f) VLAT and NVG formation techniques.

(2) Introduce

(a) Aircrew coordination peculiar to VLAT using NVGs.

(b) Lookout doctrine on NVGs.

(c) VLAT and NVG formation techniques.

(3) Review

(a) Common terminology.

(b) Low level and contour flight.

Prerequisite. VLAT-235.

6. Aerial Gunnery (AG)

a. Purpose. To develop the ability to deliver Air-To-Ground fire employing the .50 Cal/7.62 ramp gun and provide fire on targets of opportunity.

b. General

(1) Aerial gunner qualification lectures must be conducted by a designated WTCCI or AGI.

(2) At the completion of this stage, the aircrewman will demonstrate knowledge of weapons systems and ordnance delivery with crew served weapons.

(3) Initial instructional events require an AGI or WTCCI.

c. Crew Requirement. CC/AG, AGI/CCUI or AGI/AGOUI.

d. Ground Training Review all applicable manuals, MAWTS-1 academics support package lectures, and appropriate ground schools.

e. Flight Training. (2 Flights, 3.0 Hours).

AG-241 1.5 R A(2 MV-22) AGI

Goal. Introduce CCUI/AGOUI to aerial gunnery procedures with M240G/XM281.

Requirements

(1) Discuss

(a) Use and application of crew served weapons checklist.

(b) Fire discipline.

(c) Aiming techniques.

(d) Ordnance loading.

(e) Preflight.

(f) Postflight.

(g) Safety procedures associated with ordnance evolutions.

(h) Ordnance ballistics.

(i) Weapons emergency procedures.

(2) Introduce

(a) Use and application of crew served weapons checklist.

(b) Fire discipline.

(c) Aiming techniques.

(d) Ordnance loading.

(e) Preflight.

(f) Postflight.

(g) Safety procedures associated with ordnance evolutions.

(h) Practice firing on pre-briefed targets with crew served weapons, stressing crew coordination.

(3) Review. Weapons emergency procedures.

(4) This flight requires an AGI for initial flight or when aircrew is not designated an aerial gunner.

Ordnance. 500 rounds .50 cal or 7.62.

AG-243

1.5

R A(2 MV-22) N NS

AGI NSI

Goal. Introduce CCUI/AGOUI to aerial gunnery procedures with M240G/XM281 while using NVGs in HLL conditions.

Requirements

(1) Discuss

- (a) Aircrew coordination.
- (b) Crew comfort levels.
- (c) Lookout doctrine.
- (d) ICS procedures.
- (e) Aircraft clearance.
- (f) Weapons and NVG emergency procedures.

(2) Introduce

- (a) Crew coordination while using NVGs.
- (b) Firing techniques using NVGs.
- (c) Laser pointer.
- (d) Target acquisition using NVGs.

(3) Review

- (a) Use and application of crew served weapons checklist.
- (b) Fire discipline.
- (c) Aiming techniques.
- (d) Ordnance loading.
- (e) Preflight.
- (f) Postflight.
- (g) Safety procedures associated with ordnance evolutions.
- (h) Firing on prebriefed targets with crew served weapons, stressing crew coordination.
- (i) Weapons emergency procedures.

(4) An AGI NSI Crew Chief is required for initial flight.

Prerequisite. AG-241.

Ordnance. 500 rounds .50 cal or 7.62mm.

7. External Operations (EXT)

a. Purpose. To develop proficiency in external load operations and introduce external lift operations in a confined area.

b. General. All external cargo operations shall utilize HST support.

c. Ground Training

(1) Read appropriate paragraphs of the MV-22 TAC Manual.

(2) Appropriate stage lectures.

(3) Read appropriate sections of the NATOPS Manual.

(4) Crew chief should review OH-5-4A Helicopter External Cargo Loading Manual.

d. Crew Requirement. CC/AO, CC/CCUI or CC/AOUI.

e. Flight Training. (1 Flight, 2.0 Hours).

EXT-251 2.0 R A(MV-22)

Goal. Demonstrate the ability to conduct external load hook ups and drops to a confined area in conversion mode.

Requirement

(1) Discuss

(a) Aircrew coordination during external operations.

(b) Tactical considerations during external lift operations.

(c) Single and dual point operations (stress proper single/dual point switchology).

(d) Command and coordination for emergency release of load.

(2) Introduce. Tactical considerations for external operations.

(3) Review

(a) External load hook up and drops to a confined area.

(b) Complete a minimum of 5 hook up/drops.

(c) Safety precautions.

- (d) Rotor wash effects/Blowing debris.
- (e) Load rigging.
- (f) Obstacle clearance on approach and takeoff from the drop zone.

External Syllabus Support. Helicopter Support Team (HST).

8. Tactics (TAC)

a. Purpose. Introduce aircrew responsibilities during tactical missions.

b. General

(1) Aircrew should conduct these events in conjunction with the pilot syllabus.

(2) Completion of TAC-273 satisfies the requirement for NSQ HLL.

(3) A CCNSI is required for initial TAC-273.

c. Crew Requirement. CC/CCUI or CC/AOUI.

d. Ground Training

(1) Appropriate lectures of the MAWTS-1 Academic Support Package.

(2) Wing/Group/Squadron Tactical SOP.

e. Flight Training. (2 Flights, 5.0 Hours).

TAC-271 2.0 A(2 MV-22)

Goal. Introduce aircrew responsibilities during low threat tactical operations.

Requirement

(1) Discuss

- (a) METT-T.
- (b) Weather considerations.
- (c) Cabin preparation for mission particulars.
- (d) Lookout doctrine.
- (e) Penetration checklist.
- (f) Aircrew coordination.
- (g) Weapons employment.
- (h) Enemy and friendly orientation.

- (i) Receiving threat and evaluating threats.
- (j) Aircrew brief and debrief requirements.
- (2) Introduce
 - (a) Ingress, Objective Area, and Egress responsibilities.
 - (b) ICS procedures between gunner and pilots.
 - (c) Penetration checklist.
- (3) Review
 - (a) Safety precautions.
 - (b) Comfort level.
 - (c) Aircrew coordination.
 - (d) Terminology.
 - (e) Lookout doctrine.
 - (f) Weapons command and control procedures.

TAC-273

3.0

R A(2 MV-22) N NS

CCNSI

Goal. Introduce the aircrewman's responsibilities during tactical operations at night with multiple aircraft on NVGs.

Requirement

- (1) Discuss
 - (a) Taxi drop of internal cargo.
 - (b) Paradrop operations.
 - (c) Aircraft lighting.
 - (d) Embarking/debarking of troops while utilizing NVGs.
- (2) Introduce
 - (a) Differences between day/night tactical operations.
 - (b) Coordination in the cabin during night evolutions.
- (3) Review
 - (a) Loading, securing, and unloading of cargo, vehicles, and/or troops utilizing NVGs.
 - (b) Comfort level.
- (4) CCNSI required for initial conduct of event.

9. Carrier Qualification (CQ)

a. Purpose. Develop appropriate skills, procedures, and aircrew coordination required for shipboard operations.

b. General

(1) Discuss and become familiar with all aspects of shipboard operations and aircrew coordination applicable to the carrier qualification stage as described in the appropriate MV-22 NATOPS flight manual, NWP-42, the LHA/LHD NATOPS, and OPNAVINST 3710.7_.

(2) Each event requires five landings and takeoffs.

c. Ground Training. Carrier Qualification stage lecture.

d. Crew Requirements. CC, CC/CCUI, or CC/AOUI.

e. Flight Training. (2 Flights, 3.0 Hours).

CQ-291 1.0 A (MV-22)

Goal. Introduce day Field Carrier Landing Practice (FCLP).

Requirements(1) Discuss

(a) Aircrew coordination.

(b) Ship specific ICS procedures.

(c) Landing Signal Enlisted (LSE) signals.

(d) Landing directions, waveoffs, crew comfort levels, and lookout doctrine.

(2) Introduce

(a) Day FCLP patterns.

(b) Approaches, takeoffs, and landing procedures peculiar to shipboard operations.

(c) Emergency procedures peculiar to shipboard operations.

CQ-292 2.0 R A (MV-22) N NS

Goal. Introduce night, unaided and aided FCLPs.

Requirements(1) Discuss

(a) Night unaided and aided (NVG) patterns.

(b) NVG approaches and landings.

- (c) Aircraft lighting.
 - (d) Aircraft ditching.
 - (e) Emergency Egress Lighting (EELS).
 - (f) Emergency egress procedures.
- (2) Review
- (a) Day FCLP patterns, approaches, and landings.
 - (b) Aircraft lighting.
 - (c) Aircraft ditching.
 - (d) EELS.
 - (e) Emergency egress procedures.
 - (f) Emergency procedures peculiar to shipboard operations.

243. COMBAT QUALIFICATION PHASE

1. General

a. This phase of training is designed to complete proficiency in core capabilities.

b. Prior to entering any stage of training, Crew Chiefs and Aerial Observers Undergoing Instruction must complete the MAWTS-1 Course Catalog Academic Support Package lectures applicable to that stage of training.

c. Night Systems rules of conduct are per T&R Manual Vol 1.

d. Aircrews shall fly all Night Systems flights listed below under ambient light conditions of below .0022 LUX. An aircrewman is considered NSQ LLL at the completion of the following flights: ANSQ-311/313/315. The aforementioned events require a CCNSI for initial qualification. Aircrews may fly all other night systems flights in this stage under HLL or LLL conditions.

2. Carrier Qualification (CQ)

a. Purpose. To qualify aircrew in shipboard operations during day and night conditions.

b. General

(1) Discuss and become familiar with all aspects of shipboard operations, and aircrew coordination applicable to the carrier qualification stage as described in the appropriate MV-22 NATOPS Flight Manual, NWP-42, LPH/LHA/LHD NATOPS, and OPNAVINST 3710.7_.

(2) Each event requires five landings.

c. Crew Requirements. CC, CC/CCUI, or CC/AOUI. AO required for CQ -301/302

d. Flight Training. (3 Flights, 4.5 Hours).

CQ-300 1.5 R A(MV-22)

Goal. Day qualification flight.

Requirements(1) Discuss

(a) LSE signals.

(b) Aircraft to ship clearances.

(c) Voice procedures.

(d) Closure rates.

(e) Waveoffs.

(f) Shipboard refueling procedures.

- (g) Tiedown configurations.
- (h) Nose wheel steering (locked/unlocked).

(2) Introduce

- (a) Procedures required for shipboard operations.
- (b) Aircraft to ship clearances.
- (c) Voice procedures.
- (d) Closure rates.
- (e) Deck procedures for refueling.

(3) Review

- (a) Emergency procedures and egress peculiar to shipboard operations.
- (b) LSE signals.
- (c) Landing and approach patterns.

Prerequisite. CQ-291.

CQ-301

1.5 R A(MV-22) N NS

CCNSI

Goal. Night "aided" qualification flight.

Requirements

(1) Discuss

- (a) Aircraft lighting configurations.
- (b) Deck lighting configurations.
- (c) LSE signals and NVG requirements.
- (d) Voice procedures at night.
- (e) Closure rates and depth perception over water at night.
- (f) Night waveoff signals and procedures.

(2) Introduce. Procedures for carrier landings and takeoffs using NVGs.

(3) Review

- (a) Emergency procedures.
- (b) Egress peculiar to shipboard operations at night utilizing NVGs.
- (c) Aircrew coordination.

CQ-302

Prerequisite. CQ-300. Aircrews shall be NSQ HLL

1.5 R A(MV-22) N

Goal. Night "unaided" qualification flight.

Requirements

(1) Discuss

- (a) Night unaided patterns.
- (b) Unaided approaches and landings.
- (c) Aircraft lighting configuration.
- (d) Deck lighting configuration.
- (e) LSE signals.
- (f) Voice procedures.
- (g) Closure rates.
- (h) Aircraft ditching.
- (i) Emergency egress procedures.

(2) Introduce

- (a) Procedures for unaided landings and takeoffs.
- (b) Night unaided patterns.
- (c) Unaided approaches and landings.
- (d) Aircraft lighting configuration.
- (e) Deck lighting configuration.
- (f) Unaided closure rates.

(3) Review

- (a) Aircrew coordination.
- (b) Deck procedures for refueling.
- (c) Emergency Egress Lighting System (EELS).
- (d) LSE signals.
- (e) Voice procedures.

3. Night Systems (NS)

a. Purpose. To develop proficiency in the Low Light Level environment (below .0022 LUX). At the completion of this stage of training the aircrewman under instruction is considered NSQ LLL and may be designated NSQ by the squadron commanding officer.

b. General. This stage of instruction requires a CCNSI for initial qualification and all requalification.

c. Ground Training

(1) Appropriate stage lectures.

(2) Refer to the appropriate section in the MV-22 NATOPS Flight Manual, TAC Manual, and MAWTS-1 NVD Manual for LZ lighting configurations.

d. Crew Requirements. NS-311/313/315 CC/AO.

e. Prerequisite. Aircrew under instruction must be HLL NSQ prior to beginning this stage of instruction.

f. Flight Training. (3 flights, 5.0 hours).

NS-311	1.5	R	A(MV-22)	N	NS	CCNSI
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Goal. Introduce single aircraft CALs in NVG (LLL) conditions.

Requirement

(1) Discuss

- (a) Crew comfort level.
- (b) NVG LLL considerations.
- (c) Inadvertent IMC.
- (d) Distance estimation and depth perception.
- (e) NVG field of view.
- (f) Scanning techniques.
- (g) Aircraft lighting difference between HLL and LLL.
- (h) Low altitude emergencies.
- (i) Identifying uneven terrain using NVGs.
- (j) Aircraft clearances and obstacle avoidance.

(2) Introduce. Single aircraft CALs in LLL conditions.

(3) Review

- (a) Responsibilities during night CALs.

(b) Scan techniques.

NS-313

1.5

R A(2 MV-22) N NS

Goal. Introduce section NVG (LLL) CALs.

Requirement

(1) Discuss

- (a) Crew comfort level.
- (b) NVG LLL considerations.
- (c) Inadvertent IMC.
- (d) Distance estimation and depth perception.
- (e) Section and single aircraft waveoffs.

(2) Introduce. Section LLL CALs.

(3) Review

- (a) Single aircraft NVG LLL CALs.
- (b) NVG field of view and scanning techniques.
- (c) Aircraft lighting.
- (d) Low altitude emergencies.
- (e) Uneven terrain.
- (f) Aircraft clearances.
- (g) Obstacle avoidance.

Prerequisite. NS-311.

NS-315

2.0

R A(3 MV-22) N NS

CCNSI

Goal. Introduce division formation and low level navigation in NVG LLL conditions.

Requirement

(1) Discuss

- (a) NVG navigation techniques.
- (b) Terrain recognition.
- (c) Moon illumination/shadow effects on terrain.
- (d) Obstacle clearances.

(2) Introduce

- (a) Low level flight utilizing NVGs in LLL.
- (b) Division CALs using NVGs.

(3) Review

- (a) Crew comfort levels.
- (b) Aircrew coordination.
- (c) Lookout doctrine.
- (d) Terminology.
- (e) ICS procedures.

Prerequisite. NS-311.

4. Defensive Measures (DM)

a. Purpose. To develop proficiency in DM tactics and using electronic warfare principles in a medium to high threat environment with a multi-aircraft flight.

b. General

(1) A CCDMI or CCACMI is required on initial instructional flights.

(2) This flight shall be conducted against a threat emitter; e.g., SA-6, ZSU-23-4, etc.

(3) The utilization of an EW range with threat systems to include electromagnetic and ground based threat simulation; e.g., smokey SAMs, hand held pyrotechnics, etc., will greatly enhance aircrew training.

c. Prerequisites

(1) VLAT-235.

(2) Consult MAWTS-1 Academic Support Package for all recommended lectures applicable to this stage of training.

d. Crew Requirement. CC/AO, CC/CCUI OR CC/AOUI.

e. Ground Training

(1) Review applicable chapters of the MV-22 TAC Manual for electronic warfare and aircraft survivability equipment.

(2) Review appropriate chapters in the MV-22 NATOPS.

(3) Complete Basic RADAR Principles, Soviet Radio-electronics (REC), Countering the Surface to Air Threat, and Tilt-rotor ESM/ECM Equipment.

f. Flight Training. (1 Flight, 1.5 Hours).

DM-331

1.5

A(2 MV-22)

DMCCI or ACMI

Goal. Introduce and practice procedures to counter a ground-to-air threat with a multi-aircraft flight.

Requirement

(1) Discuss

(a) Aircrew coordination and crew comfort in a multi-plane flight.

(b) DECM equipment.

(c) Section tactics.

(d) Low altitude emergencies.

(e) Use of RADAR horizons and RADAR masking techniques as they relate to specific air defense systems.

(2) Introduce

(a) Threat avoidance maneuvers and tactics to defeat a ground-to-air threat.

(b) Defensive measures while dispersing chaff and flares.

(c) Section maneuvering against IR missiles and low altitude RADAR guided threats on EW range if available.

(3) Review

(a) DECM equipment.

(b) Tactical formations and maneuvers.

Ordnance. 40 chaff and 20 flares.

External Syllabus Support. EW/Threat range.

5. Tactics (TAC)

a. Purpose. To develop Crew Chief/AGO responsibilities during tactical operations in a low to medium threat environment using MCCRES standards.

b. General. All mission briefs require an intelligence brief. To the greatest extent possible incorporate the employment of escort aircraft (fixed or rotary wing), Aircraft Survival Equipment (ALE-47, APR-39, etc.) and wearing of the AR-5/M-24 gas mask. Aircrews shall conduct these flights under the standards required in applicable MCCRES Volume.

c. Crew Requirement. CC/AO, CC/CCUI OR CC/AOUI.

d. Academic Training

(1) Tactical Recovery of Aircraft and Personnel (TRAP), Opposing Forces Ground Tactics, Soviet IADS, Tilt-rotor Escort Tactics I and II, Assault Support Mission Planning, Tactical Briefing and Debriefing, Fire Support Coordination Measures, Tilt-rotor Weaponneering and Countering the Surface to Air Threat from the MAWTS-1 Academic Support Package.

(2) Review appropriate chapters of the MV-22 TAC Manual.

e. Prerequisites

(1) A CCNSI is required if aircrew are not NSQ or NSQ for appropriate light level in which the event is being conducted.

(2) TAC-273.

f. Flight Training. (2 Flights, 6.0 Hours)

TAC-342 3.0 A(3 or more MV-22) N NS CCNSI

Goal. Introduce Crew Chief/AGO responsibilities on NVGs during multiple aircraft tactical operations.

Requirement

(1) Discuss

- (a) Differences between low, medium, and high threat environments.
- (b) Differences between day and night tactical operations.
- (c) Tactical embark/debark of troops.
- (d) Taxi drop of internal cargo, paradrop operations.

(2) Introduce

- (a) Medium threat tactical scenario to MCCRES standards.
- (b) Weapons procedures with troops embarked.
- (c) Weapons command and control in objective area with troops.

(3) Review

- (a) Loading, securing, and unloading of cargo, vehicles and/or troops while using NVGs.
- (b) Penetration checklist.
- (c) Weapons procedures.
- (d) Crew comfort level.

Prerequisite. TAC-273.

Ordnance. 500 rounds, .50 cal or 7.62, 40 chaff and 20 flares.

TAC-344 3.0 R A(4+ MV-22) N NS CCNSI

Goal. Refine responsibilities during high threat tactical operations with multiple aircraft.

Requirement

(1) Discuss

- (a) Taxi drop of internal cargo.
- (b) Parachute operations.
- (c) Differences between day and night tactical operations.
- (d) Tactical embark/debark of troops.

(2) Introduce. Practice aircrew responsibilities during high threat tactical operations at night utilizing NVGs.

(3) Review

- (a) Loading, securing, and unloading of cargo, vehicles and/or troops while using NVGs.
- (b) Penetration checklist.
- (c) Weapons procedures.
- (d) Crew comfort level.

Prerequisite. TAC-342

Ordnance. 500 rounds, .50 cal or 7.62, 40 chaff and 20 flares.

6. Tilt-Rotor Insertion/Extraction Techniques (VIE)

a. Purpose. To develop proficiency in Tilt-Rotor insertion and extraction techniques and procedures.

b. General

(1) The Crew Chief shall conduct a brief with the specific team leader, then the entire team prior to takeoff with troops embarked.

(2) NSI required for initial NVD instructional flights.

(3) Fastrope frames are squadron or MALS maintained. Fastrope is user unit maintained.

c. Crew Requirement. CC/AO, CC/CCUI or CC/AOUI.

d. Prerequisite. Aircrew shall be NSQ High/Low light level as required for ambient light conditions and qualified to carry troops per T&R Manual Vol. 1 in order to conduct NVG Tilt-Rotor Insertion/Extraction (VIE).

e. External Syllabus Support. RST Master and Safety Observer.

f. Ground Training

(1) Review the MV-22 TAC Manual and FM 7-40.

(2) Preflight/postflight requirements of insertion and extraction equipment.

(3) Appropriate sections of MV-22 NATOPS Flight Manual for hoisting operations.

g. Flight Training. (3 Flights, 5.0 Hours).

VIE-351

2.0

R A(MV-22)

Goal. Introduce insertion procedures via fastrope, rappel, or hoist.

Requirement

(1) Discuss

(a) Intercabin aircrew coordination.

(b) Voice communications and standard terminology.

(c) ICS failure and hand and arm signals.

(d) Wing/Squadron/Division/Battalion SOPs.

(e) Obstacle clearance.

(f) Waveoff considerations.

(g) Emergency procedures.

(2) Introduce

(a) Pilots, Crew Chief, RST master and RST safety observer brief.

(b) Preflight of fast rope frame, rappel rigging or hoisting equipment.

(c) Troop insertion via fast rope, rappelling, or force penetrator.

(3) Review

(a) Embarking/Debarking troop procedures.

(b) Cabin procedures for troops embarked.

VIE-352

1.0 A(MV-22)

Goal. Introduce SPIE Rig operations.

Requirement

(1) Discuss

- (a) Intercabin aircrew coordination.
- (b) Voice communications and standard terminology.
- (c) ICS failure and hand an arm signals.
- (d) Wing/Squadron/Division/Battalion SOPs.
- (e) Obstacle clearance.
- (f) Waveoff considerations.
- (g) Emergency procedures.

(2) Introduce

- (a) Pilots, Crew Chief, RST master and RST safety observer brief.
- (b) Preflight of SPIE equipment.
- (c) Troop insertion/extraction via SPIE Rig.

(3) Review

- (a) Embarking/Debarking troop procedures.
- (b) Cabin procedures for troops embarked.

VIE-353

2.0

R A(MV-22) N NS

CCNSI

Goal. Introduce NVG VIE procedures.

Requirement

(1) Discuss

- (a) Intercabin aircrew coordination.
- (b) Voice communications and standard terminology.
- (c) ICS failure, hand and arm signals, and light signals.
- (d) Wing/Squadron/Division/Battalion SOPs.
- (e) Obstacle clearance.
- (f) Waveoff considerations at night.
- (g) NVG and aircraft emergency procedures.

(2) Introduce

- (a) Pilots, Crew Chief, RST master and RST safety observer brief.
- (b) Preflight of insertion/extraction equipment.
- (c) Troop insertion/extraction via SPIE Rig.

(3) Review

- (a) Embarking/Debarking troop procedures while using NVGs.
- (b) Cabin procedures for troops embarked while using NVGs.

Prerequisite. Conduct appropriate day mission prior to conducting on NVGs.

244. FULL-COMBAT QUALIFICATION PHASE

1. General

a. This phase conducts training in core plus skill events. Prior to training in this phase of the syllabus the aircrew should be complete with core skills training.

b. Aircrewmen undergoing instruction in this phase must have completed the MAWTS-1 Academic Support Package lectures prior to the appropriate stages of instruction.

c. Aircrewman may fly all night system flights in this level under HLL or LLL conditions.

2. Air Combat Maneuvering (ACM)

a. Purpose. To develop proficiency in Air Combat Maneuvering (ACM).

b. General. Air Combat Maneuvering flights require the following: (see fig. 7-1 of T&R Manual Volume 1, Chapter 7)

(1) A CCACMI is required for initial instructional flight.

(2) Aircrewman shall be ACM T&R proficient and current for non-instructional ACM flights.

(3) Aircrewman under instruction in this stage must be VLAT qualified, proficient, and current.

(3) The flight is specifically briefed to include ACM training rules per OPNAVINST 3710.7_.

(4) Aggressor aircrew must be briefed per T&R Manual Vol 1 and cover Training Rules prior to each flight.

c. External Syllabus Support. Fixed-Wing and Rotary-Wing Adversaries.

d. Prerequisites

(1) VLAT qualified.

(2) FORM-224.

(3) Aircraft should be configured with ramp gun.

e. Crew Requirement. CC/AO, CC/CCUI, or CC/AOUI.

f. Academics

(1) Complete Tactical Aircrew Coordination Considerations, Countering the Fixed-wing Threat, Introduction to Air Combat Maneuvering, Introduction to Helicopter Air Combat Maneuvering, Helo ESM/ECM Equipment and countering the Rotary Wing Threat in the MAWTS-1 Academic Support Package prior to the first ACM flight.

(2) Read appropriate chapters in the MV-22 TAC Manual.

(3) Discuss information in the MV-22 TAC Manual, pertaining to MV-22 energy and maneuverability versus a threat aircraft.

g. Flight Training. (2 Events, 2.0 Hours)

ACM-402 1.0 R 1 v 1 (vs. R/W Aggressor) CCACMI

Goal. Introduce air combat maneuvering against a rotary-wing aggressor.

Requirement

(1) Discuss

- (a) Aircrew coordination.
- (b) Crew comfort level.
- (c) Lookout doctrine.
- (d) ACM common terminology.
- (e) Situational awareness.
- (f) ACM Training rules.
- (g) Closure rate.
- (h) Radius of turn and energy state.
- (i) Use of ALE-47, APR-39, ALQ-157, and AAR-47.
- (j) ACM maneuver descriptions.

(2) Introduce

- (a) Tilt-rotor versus helicopter air combat maneuvering with an aggressor helicopter.
- (b) ACM common terminology.
- (c) ACM lookout doctrine.
- (d) Division of cabin duties during engagement.

(3) Review

- (a) Tilt-rotor performance characteristics and P(k) charts.
- (b) Maneuver limitations per NATOPS Flight Manual.

External Syllabus Support. Rotary-Wing Adversary (with forward firing ordnance capability if possible).

Ordnance. 30 chaff and 30 flares.

ACM-405

1.0

R 2 v 1 F/W Aggressor

CCACMI

Goal. Introduce section air combat maneuvering against a fixed-wing aggressor.

Requirement

(1) Discuss

- (a) Aircrew coordination.
- (b) Intra- and inter-aircraft coordination.
- (c) Crew comfort level.
- (d) Lookout doctrine.
- (e) ACM common terminology.
- (f) Situational awareness.
- (g) ACM Training rules.
- (h) Closure rate.
- (i) Radius of turn and energy state.
- (j) Use of ALE-47, APR-39, ALQ-157, and AAR-47.
- (k) ACM maneuver descriptions.

(2) Introduce

- (a) Tilt-rotor versus helicopter air combat maneuvering with an aggressor helicopter.
- (b) ACM common terminology.
- (c) ACM lookout doctrine.
- (d) Division of cabin duties during engagement.

(3) Review

- (a) Tilt-rotor performance characteristics and P(k) charts.
- (b) Maneuver limitations per NATOPS Flight Manual.

Ordnance. 30 chaff and 30 flares.

External Syllabus Support. Fixed Wing Adversary.

3. External Operations (EXT)

a. Purpose. To develop proficiency in external load operations in the VLAT environment.

b. General

(1) All external cargo operations shall utilize HST support. Crew chief should review OH-5-4A Helicopter External Cargo Loading Manual.

(2) A CCNSI is required for initial conducted using NVGs.

(3) Read appropriate Chapters of the NATOPS Manual.

(4) Read appropriate paragraphs of the MV-22 TAC Manual.

(5) Emphasis will be on VLAT flight with an external load vice pickup and delivery techniques. Minimum of two pickup and deliveries required.

c. Prerequisite. This event must be executed during the day prior to executing the option to conduct at night.

d. Crew Requirement. CC/AO, CC/CCUI or CC/AOUI.

e. Flight Training. (1 Flight, 1.0 Hours).

EXT-411 2.0 A (MV-22) (N) (NS) CCVLATI (CCNSI)

Goal. Introduce external operations in low level and contour VLAT conditions (single or dual point).

Requirement

(1) Discuss

(a) Hookup options (single or dual point).

(b) Load length considerations for VLAT flight regime.

(c) Preflight planning.

(d) Weight and balance considerations.

(e) Operational power.

(f) Airspeed limitations.

(g) Safety considerations peculiar to MV-22 single/dual point VLAT external operations.

(h) Proprotor clearances (perform actual walkaround) for VLAT external operations.

(2) Introduce. Single and dual point external cargo operations in a VLAT environment.

(3) Review

(a) Aircrew responsibilities during VLAT flight.

- (b) Cargo pendant release procedures.
- (c) HST operation/safety brief.
- (d) Waveoffs.
- (e) Reduced visibility conditions.
- (f) Brown/white out considerations.
- (g) Ground to aircraft relationship.
- (h) Drift correction.
- (i) Terminology.
- (j) Cargo hook and pendant inspection.

4. Nuclear, Biological, and Chemical (NBC)

a. Purpose. Conduct flight operations while wearing protective equipment.

b. General

(1) Aircrew may fly this event during the FAM, CAL, TAC, or NBC stage of the pilot syllabus.

(2) The day event shall be conducted prior to executing these events using NVGs.

(3) For the safe execution of initial NBC flights, one pilot and one aircrewman shall remain unmasked, but on subsequent flights except NVG flights, one pilot will remain unmasked. For NVG training flights, one pilot and one aircrewman will remain unmasked per the T&R Manual, Vol 1.

c. Crew Requirements. CC/AO, CC/CCUI or CC/AOUI.

d. Ground Training

(1) Discuss the wearing of the NBC defense suit, mask, hood, gloves, and boots. Introduce proper maintenance and serviceability checks on equipment, emphasizing donning of equipment.

(2) Discuss physiological factors associated with flying with NBC protective equipment.

(3) MAWTS-1 Academic Support Package lecture applicable to this event.

e. Flight Training. (1 Flight, 1.0 Hour).

NBC-422

1.0

A (MV-22)

Goal. Introduce flight in a simulated NBC environment with either the AR-5 or M-25 mask and MOPP protective suit.

Requirement(1) Discuss

- (a) Chemical agents.
- (b) Biological agents.
- (c) Fatigue.
- (d) Distortion of vision while using the M-24 or AR-5 gas mask.

(2) Introduce

- (a) Donning of chemical suit and M-24 or AR-5 gas mask.
- (b) Preflight of equipment.
- (c) Aircrewman duties while wearing the M-24 or AR-5 gas mask, to include taxi, takeoff, hover, low work, and landings.

5. Tilt-Rotor Insertion/Extraction Techniques (VIE)

a. Purpose. To develop proficiency in Tilt-rotor Insertion/Extraction methods in executing special missions.

b. General. The Crew Chief/AGO shall conduct a brief with the specific team leader then the entire team prior to takeoff to discuss mission requirements and aircraft safety procedures. NSI required for initial instructional Night Systems events.

c. Crew Requirement. CC/AO, CC/CCUI or CC/AOUI.

d. Prerequisite. Aircrew shall be NSQ HLL/LLL as required for ambient light conditions and qualified to carry troops per T&R Manual Vol 1 in order to conduct Tilt-rotor Insertion/Extraction (VIE).

e. External Syllabus Support. RST Master and Safety Observer.

f. Academic Training. Review the MV-22 TAC Manual and FM 7-40.

g. Flight Training. (2 Flights, 2.5 Hours).

VIE-430

1.5

A(MV-22)

Goal. Introduce aerial delivery procedures.

Requirement(1) Discuss

- (a) Aircrew coordination during aerial deliveries.
- (b) Voice communication and standard terminology.

(c) Tactical considerations for aerial delivery of troops/cargo.

(d) Rigging and preflight of equipment.

(2) Introduce

(a) Insertion of troops/cargo by aerial delivery.

(b) Rigging and preflight of equipment.

(c) Tactical considerations for aerial delivery of troops/cargo.

VIE-431

1.5

A (MV-22)

Goal. Introduce tactical aerial insertion of troops and equipment via helo cast and/or soft duck (deflated rubber boat).

Requirement

(1) Discuss

(a) Aircrew coordination while performing helo cast or soft duck operations.

(b) Voice communications and standard terminology.

(c) Rigging and preflight of helo cast and soft duck equipment.

(d) Low altitude aircraft emergencies over water.

(e) Ditching and water landing.

(f) Salt encrustation and compressor stall.

(g) Helo cast/soft duck aerial delivery altitudes and airspeeds.

(2) Introduce

(a) Insertion of troops and equipment by helo cast or soft duck.

(b) Rigging and preflight of helo cast or soft duck equipment.

(c) Voice communications and standard terminology.

(d) Aircrew coordination while performing helo cast or soft duck operations.

6. Tactics (TAC)

a. Purpose. To refine aircrew responsibilities during tactical operations in a medium to high threat environment.

b. General

(1) All mission briefs require an intelligence brief.

(2) Incorporate the employment of escort aircraft (fixed or rotary wing), ALE-47 and the APR-39, and wearing of the AR-5/M-24 gas mask.

(3) Aircrews shall conduct these flights under the standards required in MCO 3501.4, MCCRES, Volume IX, Special Operations.

(3) An CCNSI is required on initial TAC-440.

c. Crew Requirement. CC/AO, CC/CCUI OR CC/AOUI.

d. Academic Training

(1) Tactical Recovery of Aircraft and Personnel (TRAP), Opposing Forces Ground Tactics, Soviet IADS, Tilt-rotor Escort Tactics I and II, Assault Support Mission Planning, Tactical Briefing and Debriefing, Fire Support Coordination Measures, Tilt-rotor Weaponneering and Countering the Surface to Air Threat from the MAWTS-1 Academic Support Package.

(2) Review appropriate chapters of the MV-22 TAC Manual.

(3) Review appropriate section of Tilt-rotor MCCRES Volume.

e. Prerequisites

(1) Aircrewman must be NSQ for appropriate light level.

(2) TAC-344.

f. Flight Training. (1 Flight, 3.0 Hours).

TAC-440	3.0	R	A(4 ACFT)	N	NS	CCNSI
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Goal. To develop proficiency in NVD (LLL) tactical operations in a high threat environment using MCCRES standards.

Requirement

(1) Discuss

(a) Mission specific requirements.

(b) Differences between day and night tactical operations.

(c) Embarking/debarking of tactical troops.

(2) Introduce. Practice aircrew responsibilities during a tactical operation.

(3) Review

(a) Loading, securing, and unloading of cargo, vehicles and/or troops.

(b) Crew comfort level.

(c) Aircrew coordination.

(d) Weapons command and control.

(e) Penetration checklist procedures.

Ordnance. 500 rounds, .50 cal/500 rounds 7.62, 20 chaff and 20 flares.

250. INSTRUCTOR TRAINING1. Crew Chief FRS Instructor Training

a. Purpose. To certify a qualified MV-22 Crew Chief in instructional procedures and techniques to support Crew Chief and Aerial Observer training at the Fleet Replacement Squadron.

b. General

(1) All instructor under training events are intended to emphasize standardization of Crew Chief procedures and techniques. The Crew Chief Instructor Under Training (CCIUT) should be capable of demonstrating and verbalizing all training objectives associated with the Combat Capable Phase of instruction.

(2) For academic support and certification criteria for VLAT and NFSCC Instructors refer to MAWTS-1 Course Catalog.

c. Crew Requirement. CCI/CCIUI.d. Flight Training. (5 Flights, 8.0 Hours).

FAM-501 1.5 E A(MV-22) N

Goal. Introduce and demonstrate standardized procedures for preflight, mission preparation, and postflight to include plane captain duties.

Requirement(1) Discuss

- (a) Instructional techniques.
- (b) Student tendencies.
- (c) Standardized procedures.
- (d) Common student mistakes.

(2) Introduce

- (a) Instructional techniques.
- (b) Student tendencies.
- (c) Standardized procedures.

(3) Review. Crew Chief FAM procedures.

CAL-504 1.5 E A(MV-22)

Goal. Review CAL/MAL instructional techniques.

Requirement(1) Discuss

- (a) ICS procedures and common tendencies.
 - (b) Closure rates to the ground.
 - (c) Waveoff procedures.
 - (d) Ramp operations.
 - (e) Obstacle clearance calls.
 - (f) Common student mistakes.
- (2) Introduce
- (a) ICS procedures and common tendencies.
 - (b) Closure rates to the ground.
 - (c) Waveoff procedures.
 - (d) Ramp operations.
 - (e) Obstacle clearance calls.
- (3) Review
- (a) Lookout doctrine.
 - (b) Aircraft clearances.
 - (c) Crew Chief duties during CAL landings and takeoffs.
 - (d) Aircrew coordination.

FORM-505

1.5 E A(2 MV-22)

Goal. Review formation flight instructional techniques.

Requirement

- (1) Discuss
- (a) Parade and cruise formations and positioning.
 - (b) Closure rates between aircraft.
 - (c) Hand and arm signals.
 - (d) Inter and intra-aircraft coordination.
 - (e) Common student mistakes.
- (2) Introduce
- (a) Lookout doctrine techniques in formation flight.
 - (b) Scanning techniques.

EXT-506

(3) Review. Crew Chief duties.

1.5 E A(MV-22)

Goal. Review instructional techniques and terminology for external load operations.

Requirement

(1) Discuss

- (a) Cargo hooks.
- (b) Cargo hook control panel.
- (c) Portable pendant control.
- (d) Cargo hook emergency release handle.
- (e) Static discharge precautions.
- (f) Load rigging.
- (g) Equipment preflight.
- (h) Emergency release of external load.
- (i) Common student mistakes.
- (j) Emergencies peculiar to external cargo operations.

(2) Introduce

- (a) Cargo hook control panel.
- (b) Portable pendant control.
- (c) Cargo hook emergency release handle.
- (d) Static discharge precautions.
- (e) Load rigging.
- (f) Equipment preflight.

(3) Review. Crew Chief duties during external cargo operations.

(4) Conduct. Perform minimum of three hookup and releases.

STANX-507

2.0 E A(MV-22) (N) (NS)

Goal. Crew Chief Instructor standardization check.

Requirement

(1) Evaluate the prospective Crew Chief Instructor for standardization of instructional techniques and flight

procedures. All stages of training should be evaluated if possible. Itinerary will be set by the evaluator.

(2) Aerial observer required if using NVGs.

2. Night Systems Familiarization Crew Chief Instructor Training

a. Purpose. To certify instructor Crew Chiefs for FRS Night Vision Goggle events using a standardized flight training program.

b. General

(1) Fly IUT flights with a designated CCNSI or MAWTS-1 CC Instructor.

(2) All IUTs shall complete every event of the instructor training syllabus.

c. Training Objectives

(1) All IUT flights shall emphasize instructional techniques, briefing, and debriefing. The IUT will be capable of demonstrating all training objectives listed for the referenced syllabus events. Emphasis of all flights is on training objectives, method of instruction, and student problem areas. At the completion of this stage of training, the pilot will be designated a Crew Chief Night Systems Familiarization Instructor (CCNSFI) and qualified to instruct all Night Vision Goggle Combat Capable HLL events.

(2) The MAWTS-1 Course Catalog contains the prerequisites and course training requirements for this stage of training.

d. Crew Requirement. IP/IUT/CC/AO.

e. Flight Training. (4 Flights, 4.0 Hours).

NVG-560 Refer to MAWTS-1 Course Catalog.

NVG-561 Refer to MAWTS-1 Course Catalog.

NVG-562 Refer to MAWTS-1 Course Catalog.

NVG-563 Refer to MAWTS-1 Course Catalog.

251. REQUIREMENTS, QUALIFICATIONS, DESIGNATIONS

1. Purpose. Determine qualification for designation in specific flight skills and system knowledge.

2. General

1. This is an annual flight requirement as listed in OPNAVINST 3710.7_ and the MV-22 NATOPS manual.

2. The evaluating Crew Chief shall be a designated CC NATOPS Evaluator.

3. Crew Requirement. CC/CC or CC/AO.

4. Flight Training. (1 Flight, 1.5 Hours).

RQD-600 1.5 E A(MV-22) (N) (NS) CC NATOPS EVALUATOR

Goal. Completion of the annual NATOPS evaluation.

Requirement. Evaluate proficiency in the knowledge and utilization of all flight skills and systems pertaining to the MV-22.

RQD-604 2.0 E A(MV-22) FCP

Goal. Conduct a post maintenance functional check evaluation for the Crew Chief position.

Requirement. Evaluate proficiency in the knowledge and utilization of all test equipment, FCF procedures and systems pertaining to the MV-22 during a post maintenance check flight. Evaluation shall be based on this event after the completion of a locally prepared syllabus in accordance with OPNAV 4790.

252. Graduate Level Courses

1. There are six graduate level courses that qualify Crew Chief Instructors for specific portions of the T&R syllabus. These courses are as follows:

- a. Weapons and Tactics Crew Chief Instructor (WTCCI Sec MOS 61XX).
- b. Crew Chief Tilt-rotor Low Altitude Training Instructor (CCVLATI).
- c. Crew Chief Night Systems FAM Instructor (CCNSFI).
- d. Crew Chief Night Systems Instructor (CCNSI).
- e. Crew Chief Defensive Measures Instructor (CCDMI).
- f. Crew Chief Air Combat Maneuvering Instructor (CCACMI).

2. The above courses and applicable training codes will be listed in the current MAWTS-1 Course Catalog. There will be no re-fly factors for these instructor flights. T&R syllabus currency in stages is considered sufficient to maintain currency as an instructor. Weapons and Tactics Crew Chief Instructors (WTCCI's) are only qualified at the Weapons and Tactics course given at MAWTS-1 during WTI.

260. ORDNANCE REQUIREMENTS. These requirements are based on a "crew basis."

{li P350034m.gif:Ordnance requirements}

*Annual Ordnance requirements maintain an aircrew member at core competency.

AIRCRAFT: MV-22			MOS: 6175		CREW POSITION: CREW CHIEF		
FLT			REFLY				
<u>STAGE</u>	<u>TRNG CODE</u>	<u>HRS</u>	<u>INTERVAL</u>	<u>CRP</u>	<u>R</u>	<u>E</u>	<u>REMARKS</u>
COMBAT CAPABLE PHASE							
SFAM	100	2.0	*	2.0			S
FAM	111	1.5	*	2.0			A
FAM	112	1.5	*	2.0			A
FAM	113	1.5	*	2.0			A
FAM	116	2.0	*	2.0			A
FAM	118	1.5	*	2.0			A
FAM	120	1.5	*	2.0			A N
FAM	122	1.5	*	2.0			A N NS
INT	130	2.0	*	2.0			A(static)
INT	131	2.0	*	2.0			A(static)
INT	135	1.5	*	2.0			A (N) (NS)
SCAL	140	2.0	*	2.0			S(FFS)
CAL	141	1.5	*	3.0			A
CAL	142	1.5	*	3.0			A
CAL	143	1.5	*	3.0			A N NS
SNAV	150	2.0	*	2.0			A(FFS)
NAV	151	1.5	*	2.0			A (N) (NS)
VLAT	162	1.5	*	2.0			A
VLAT	163	1.5	*	2.0			A
FORM	172	2.0	*	2.0			2 A
FORM	174	2.0	*	2.0			2 A N NS
SEXT	180	2.0	*	2.0			S(FFS)
EXT	182	1.5	*	2.0			A
EXT	183	2.0	*	3.0			A
EXT	184	1.5	*	3.0			A N NS
SREV	190	1.0		2.0		X	S(FFS)
CCX	193	1.5	*	3.0		X	A (N) (NS)
COMBAT READY PHASE							
INT	200	2.0	12	0.8			A (N)
INT	201	2.0	12	0.8	X		A (N)
CAL	211	2.0	6	0.8			A
CAL	212	2.0	6	0.8	X		A
CAL	214	2.0	6	0.8	X		A N NS
FORM	221	2.0	12	0.8			2 A
FORM	222	1.5	6	0.8	X		2 A
FORM	224	2.0	6	0.8	X		2 A N NS

Figure 2-2.--MOS 6175 Refly Interval, Combat Readiness Percentage.

AIRCRAFT: MV-22			MOS: 6175		CREW POSITION: CREW CHIEF		
FLT		HRS	FLY		R	E	REMARKS
STAGE	TRNG CODE		INTERVAL	CRP			
VLAT	231	1.5	6	0.6			A
VLAT	233	1.5	6	0.6	X		2 A
VLAT	235	1.5	6	0.6			A N NS
VLAT	236	1.5	6	0.8	X		2 A N NS
AG	241	1.5	6	0.8	X		2 A
AG	243	1.5	6	0.8	X		2 A N NS
EXT	251	2.0	6	0.8	X		A
TAC	271	2.0	12	1.0			2 A
TAC	273	3.0	6	1.0	X		2 A N NS
CQ	291	1.0	12	0.8	X		A
CQ	292	2.0	12	0.8	X		A N NS
COMBAT QUALIFICATION PHASE							
CQ	300	1.5	12	1.5	X		A
CQ	301	1.5	12	1.5	X		A N NS
CQ	302	1.5	12	1.5	X		A N
NS	311	1.5	12	2.0	X		A N NS
NS	313	1.5	12	2.0	X		2 A N NS
NS	315	2.0	12	2.0	X		3 A N NS
DM	331	1.5	12	1.5			2 A
TAC	342	3.0	12	2.0			3 A N NS
TAC	344	3.0	12	2.0	X		4 A N NS
VIE	351	2.0	12	1.3	X		A
VIE	352	1.0	12	1.3			A
VIE	353	2.0	12	1.4	X		A N NS
FULL-COMBAT QUALIFICATION PHASE							
ACM	402	1.0	12	0.5	X		1 v 1 R/W
ACM	405	1.0	12	0.5	X		2 v 1 F/W
EXT	411	2.0	12	1.0			A (N) (NS)
NBC	422	1.0	12	1.0			A
VIE	430	1.5	12	0.5			A
VIE	431	1.5	12	0.5			A
TAC	440	3.0	12	1.0	X		4 A N NS

Figure 2-2.--MOS 6175 Refly Interval, Combat Readiness Percentages-cont.

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AIRCRAFT: MV-22		MOS: 6175		CREW POSITION: CREW CHIEF	
FLT		REFLY			
<u>STAGE</u>	TRNG CODE	HRS	INTERVAL	<u>CRP</u>	R E REMARKS
INSTRUCTOR TRAINING					
FAM	501	1.5			X A N
CAL	504	1.5	*	0	X A
FORM	505	1.5	*	0	X 2 A
EXT	506	1.5	*	0	X A
STANX	507	2.0	*	0	X A (N) (NS)
REQUIREMENTS, QUALIFICATIONS, AND DESIGNATIONS					
RQD	600	1.5	12	0	X A (N) (NS)
RQD	604	2.0	*	0	X A

Figure 2-2.--MOS 6175 Refly Interval, Combat Readiness Percentages-Cont.

AIRCRAFT: MV-22			CREW POSITION: AERIAL GUNNER/OBSERVER					
<u>STAGE</u>	<u>TRNG</u>	<u>CODE</u>	<u>HRS</u>	<u>REFLY</u> <u>INTERVAL</u>	<u>CRP</u>	<u>R</u>	<u>E</u>	<u>REMARKS</u>
COMBAT CAPABLE PHASE								
FAM	111	1.5	*	3.0				A
FAM	120	1.5	*	3.5				A N
FAM	122	1.5	*	3.5				A N NS
INT	130	0.0	*	3.0				A(static)
INT	131	0.0	*	3.0				A(static)
INT	135	1.5	*	3.0				A (N) (NS)
CAL	141	1.5	*	4.0				A
CAL	143	1.5	*	4.0				A N NS
VLAT	162	1.5	*	4.0				A
VLAT	163	1.5	*	4.0				A
FORM	172	2.0	*	4.0				2 A
FORM	174	2.0	*	4.0				2 A N NS
EXT	182	1.5	*	4.0				A
EXT	183	2.0	*	4.0				A
EXT	184	1.5	*	4.0				A N NS
CCX	193	1.5	*	5.0			X	A (N) (NS)
COMBAT READY PHASE								
INT	200	2.0	12	0.5				A (N)
INT	204	2.0	12	0.5		X		A (N)
CAL	211	2.0	12	1.0				A
CAL	212	2.0	6	1.0		X		A
CAL	214	2.0	6	1.0		X		A N NS
FORM	221	2.0	12	1.0				2 A
FORM	222	1.5	6	1.0		X		2 A N NS
FORM	224	2.0	6	1.0		X		2 A N NS
VLAT	233	1.5	6	1.0				A
VLAT	235	1.5	6	1.0		X		2 A N NS
AG	241	1.5	12	1.0		X		2 A
AG	243	1.5	12	1.0		X		2 A N NS
TAC	271	2.0	12	1.0				2 A
TAC	273	3.0	6	1.0		X		2 A N NS
CQ	291	1.0	12	1.0				A
CQ	292	2.0	12	1.0		X		A N NS

Figure 2-3.--A/O Refly Interval, Combat Readiness Percentage

AIRCRAFT: MV-22			CREW POSITION: AERIAL GUNNER/OBSERVER					
FLT		REFLY						
<u>STAGE</u>	TRNG CODE	HRS	INTERVAL	<u>CRP</u>	R	E	REMARKS	
COMBAT QUALIFICATION PHASE								
CQ	300	1.5	12	1.5			A	
CQ	301	1.5	12	1.5	X		A N	
CQ	302	1.5	12	1.5	X		A N NS	
NS	311	1.5	12	2.0	X		A N NS	
NS	313	1.5	12	2.0	X		2 A N NS	
NS	315	2.0	12	2.0	X		3 A N NS	
DM	331	1.5	12	1.5	X		2 A	
TAC	342	3.0	12	2.0			3 A N NS	
TAC	344	3.0	12	2.0	X		4 A N NS	
VIE	351	2.0	12	1.3			A	
VIE	352	1.0	12	1.3			A	
VIE	353	2.0	12	1.4	X		A N NS	
FULL-COMBAT QUALIFICATION PHASE								
ACM	402	1.0	12	1.0	X		1 v 1 R/W	
ACM	405	1.0	12	1.0	X		2 v 1 F/W	
EXT	411	2.0	12	1.0			A (N) (NS)	
NBC	422	1.0	12	1.0			A (N) (NS)	
TAC	440	3.0	12	1.0	X		4 A N NS	
REQUIREMENTS, QUALIFICATIONS, AND DESIGNATIONS								
RQD	604	1.5	12	0.0		X	A (N) (NS)	

Figure 2-2.--A/O Refly Interval, Combat Readiness Percentages-Cont.

<u>STAGE</u>	<u>FLIGHT</u>	MV-22 CREW CHIEF FLIGHT UPDATE CHAINING FLIGHTS UPDATED
INT	200 204	
CAL	211 212 214	211
FORM	221 222 224	211 211, 221 211, 214, 221, 222
VLAT	231 233 235	231 231, 233
AG	241 243	241
EXT	251	
TAC	271 273	211, 221, 222 211, 221, 222, 224, 271
CQ	291 292	291
CQ	300 301 302	291 292, 300 292, 300, 301
NS	311 313 315	214, 224, 235 214, 224, 235, 311 214, 224, 235, 311, 313
DM	331	
TAC	342 344	211, 221, 222, 224, 271 211, 221, 222, 224, 271, 342
VIE	351 352 353	
ACM	402 405	402
EXT	411	251
NBC	422	
VIE	430 431	
TAC	440	211, 221, 222, 224, 271, 342, 344

Figure 9-3.--MV-22 CREW CHIEF Flight Update Chaining

<u>STAGE</u>	<u>FLIGHT</u>	MV-22 AERIAL OBSERVER UPDATE CHAINING FLIGHTS UPDATED
INT	200 204	
CAL	211 212 214	211
FORM	221 222 224	211 211, 221 211, 214, 221, 222
VLAT	233 235 236	233 233, 235
AG	241 243	241
TAC	271 273	211, 221, 222 211, 221, 222, 224, 271
CQ	291 292	291
CQ	300 301 302	291 292, 300 292, 300, 301
NS	311 313 315	214, 224, 235 214, 224, 235, 311 214, 224, 235, 311, 313
DM	331	
TAC	342 344	211, 221, 222, 224, 271 211, 221, 222, 224, 271, 342
VIE	351 352 353	
ACM	402 405	402
EXT	411	
NBC	422	
TAC	440	211, 221, 222, 224, 271, 342, 344

Figure 9-4.--MV-22 AERIAL OBSERVER Flight Update Chaining